



AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

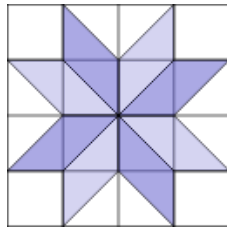
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AMC 2025

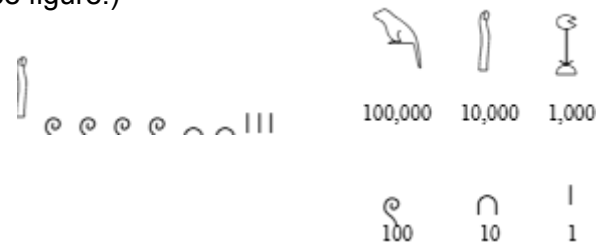
1. The eight-pointed star (in a 4x4 grid) covers what percent of the whole grid? (See figure.)

A. 40
B. 50
C. 60
D. 75
E. 80



2. Ancient Egyptian numerals: What number is shown by the given glyphs? (See figure.)

A. 1,423
B. 10,423
C. 14,023
D. 14,203
E. 14,230



3. Buffalo Shuffle-o cards: Annika and 3 friends each get 15 cards. If 2 more friends join (so 6 players total), how many cards per player?

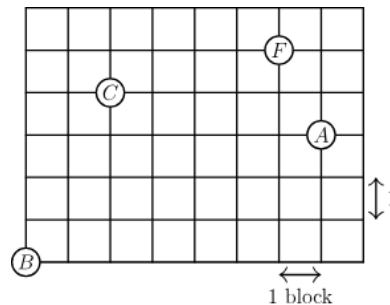
A. 8
B. 9
C. 10
D. 11
E. 12

4. Lucius counts backward by 7s: 100, 93, 86, ... What is his 10th number?

A. 30
B. 37
C. 42
D. 44
E. 47

[illegible]

A. 20
B. 22
C. 24
D. 26
E. 28



6. From $\{15, 16, 17, 18, 19\}$, one number is erased so the sum of the remaining four is a multiple of 4. Which number was erased?

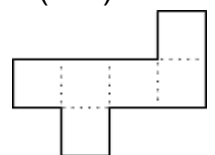
A. 15
B. 16
C. 17
D. 18
E. 19

7. Exam scores: $\geq 95\%$ (5 students), $\geq 90\%$ (13), $\geq 85\%$ (27), $\geq 80\%$ (50). How many scored at least 80% and less than 90%?

A. 8
B. 14
C. 22
D. 37
E. 45

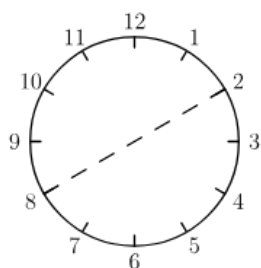
8. A cube is cut open to a net of 6 equal squares with total area 18 cm^2 . What was the cube's volume (cm^3)?

A. 3^3
B. 6
C. 9
D. 6^3
E. 9^3



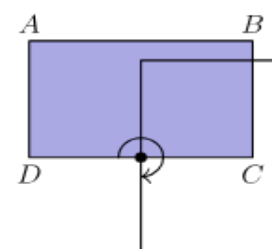
9. A clock's 6 opposite-number pairs are averaged; then those 6 averages are averaged. What is the result?

A. 5
B. 6.5
C. 8
D. 9.5
E. 12



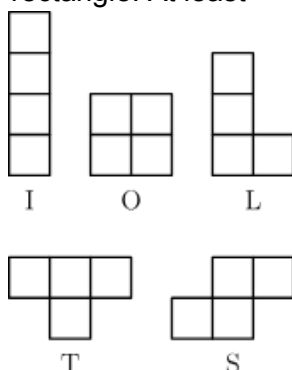
10. Rectangle ABCD ($AB=5$, $AD=3$) is rotated 90° clockwise about the midpoint of DC to make a second rectangle. What total area is covered by the two rectangles? (They overlap.) (in^2)

A. 21
B. 22.25
C. 23
D. 23.75
E. 25



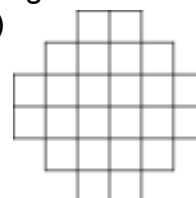
11. Three tetrominoes exactly cover a 3×4 rectangle. At least one tile is S. What are the other two tiles?

- A. I and L
- B. I and T
- C. L and L
- D. L and S
- E. O and T

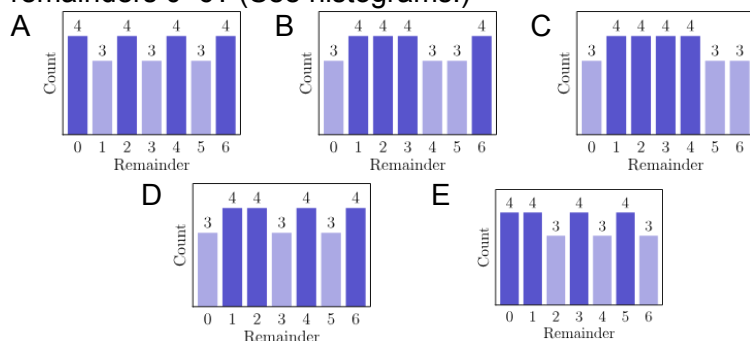


12. The region consists of 24 unit squares (1 cm side). What is the area of the largest circle that fits entirely inside the region? (See figure.)

- A. 3π
- B. 4π
- C. 5π
- D. 6π
- E. 8π



13. Even numbers 2, 4, ..., 50 are each divided by 7; remainders are recorded. Which histogram matches the frequencies of remainders 0–6? (See histograms.)

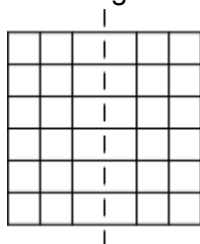


14. Insert N into the list 2, 6, 7, 7, 28 so that the new mean is twice the median. What is N?

- A. 7
- B. 14
- C. 20
- D. 28
- E. 34

15. A 6×6 grid has 13 squares colored silver, the rest gold. Fold vertically to form 18 overlapping pairs. Let m be the minimum and M the maximum possible number of gold-on-gold pairs. What is $m+M$?

- A. 12
- B. 14
- C. 16
- D. 18
- E. 20

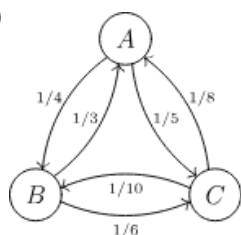


16. Choose five distinct integers from 1–10 and five distinct integers from 11–20 with the rule: no two chosen numbers differ by exactly 10. What is the sum of the ten chosen numbers?

- A. 95
- B. 100
- C. 105
- D. 110
- E. 115

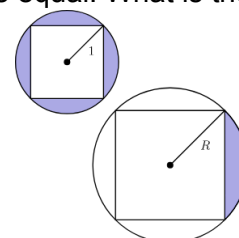
17. Markovia: Cities A (100), B (120), C (160). Arrows show fractions of residents working in other cities. How many people work in A? (See diagram.)

- A. 55
- B. 60
- C. 85
- D. 115
- E. 160



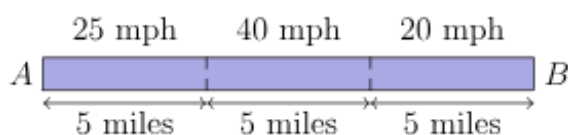
18. Left: circle radius 1 with shaded ring between circle and inscribed square. Right: same setup but only one quarter of that ring shaded. The shaded areas are equal. What is the radius R of the right circle?

- A. $\sqrt{2}$
- B. 2
- C. $2\sqrt{2}$
- D. 4
- E. $4\sqrt{2}$



19. Straight 15-mile road A—B with speed limits by 5-mile sections: 25 mph, then 40 mph, then 20 mph. Two cars start at A and B, each obeying speed limits, driving toward each other. How far from A do they meet? (miles)

- A. 7.75
- B. 8
- C. 8.25
- D. 8.5
- E. 8.75



20. Three people (Sarika → Dev → Rajiv → Sarika → ...) each eat half of what remains of a cheese block, in turn, until it's gone. About what fraction of the original does Sarika eat in total?

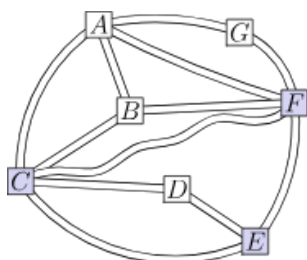
- A. $4/7$
- B. $3/5$
- C. $2/3$
- D. $3/4$
- E. $7/8$

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21. Pods A–G are assigned grades 1–7 (one per pod). Connected pods must differ by at least 2 grade levels. What is the sum of grades in pods C, E, and F? (See walkway graph.)

- A. 12
- B. 13
- C. 14
- D. 15
- E. 16



22. There are 35 coat hooks in a row. Paulina places coats equally spaced so there are the same number of empty hooks before the first coat, between consecutive coats, and after the last coat. With at least 1 coat and at least 1 empty hook, how many different coat counts are possible?

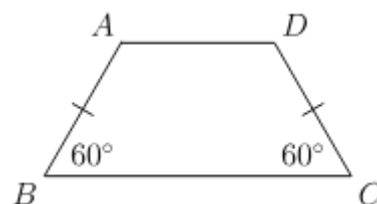
- A. 2
- B. 4
- C. 5
- D. 7
- E. 9

23. How many four-digit numbers satisfy all: (I) tens and ones digits are both 9; (II) the number is 1 less than a perfect square; (III) the number is the product of exactly two primes?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

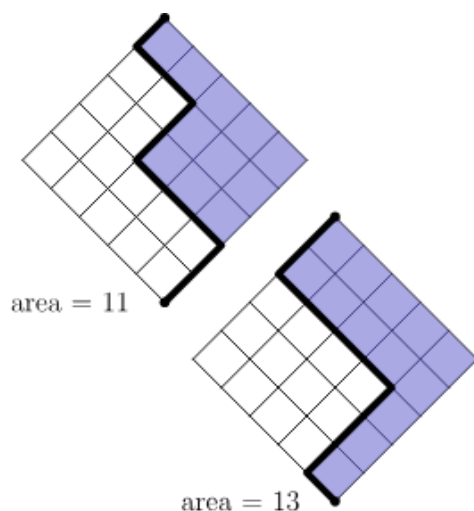
24. Trapezoid ABCD has $\angle B = \angle C = 60^\circ$ and $AB = DC$. All side lengths are positive integers; perimeter is 30. How many non-congruent trapezoids satisfy this?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4



25. In a 5×5 diamond grid, a path goes from bottom to top via unit steps NE or NW. For each path, compute the area between the path and the right side of the grid. What is the sum of these areas over all possible paths?

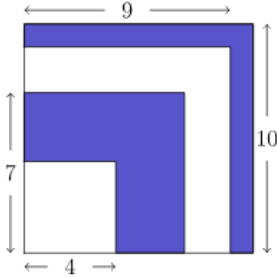
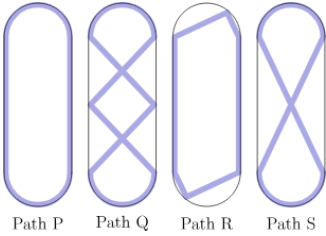
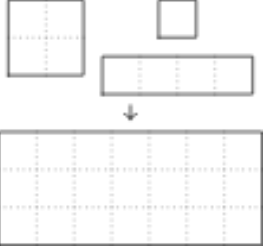
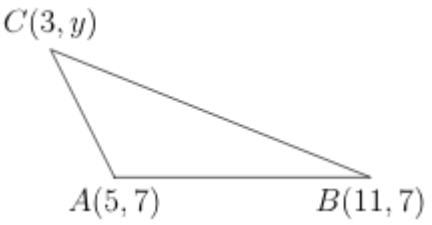
- A. 2520
- B. 3150
- C. 3840
- D. 4730
- E. 5050



Answer Key:

- 1. B
- 2. B
- 3. C
- 4. B
- 5. C
- 6. C
- 7. D
- 8. A
- 9. B
- 10. D
- 11. C
- 12. C
- 13. A
- 14. E
- 15. C
- 16. C
- 17. D
- 18. B
- 19. D
- 20. A
- 21. A
- 22. D
- 23. B
- 24. E
- 25. B

AMC 2024

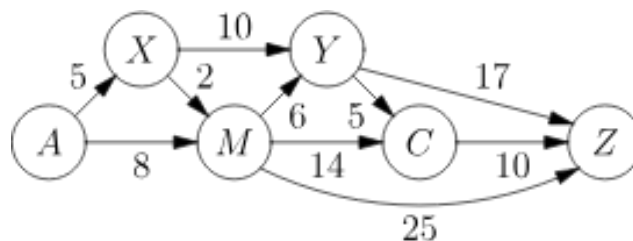
1. What is the ones digit of $222,222 - 22,222 - 2,222 - 222 - 22 - 2$? A. 0 B. 2 C. 4 D. 6 E. 8	2. Evaluate in decimal: $44/11 + 110/44 + 44/1100$ A. 6.4 B. 6.504 C. 6.54 D. 6.9 E. 6.94
3. Four aligned squares with sides 4, 7, 9, 10 (alternating colors). What is the visible colored area? A. 42 B. 45 C. 49 D. 50 E. 52 	4. Yunji sums 1 to 9 but misses one number; her (incorrect) sum is a perfect square. Which number was missed? A. 5 B. 6 C. 7 D. 8 E. 9
5. Two fair dice are rolled; the product is a multiple of 6. Which sum cannot occur? A. 5 B. 6 C. 7 D. 8 E. 9	6. Four skating paths P, Q, R, S are shown. Order them (shortest → longest). A. P, Q, R, S B. P, R, S, Q C. Q, S, P, R D. R, P, S, Q E. R, S, P, Q 
7. A 3×7 rectangle is tiled by 2×2, 1×4, and 1×1 tiles. What is the minimum number of 1×1 tiles? A. 1 B. 2 C. 3 D. 4 E. 5 	8. Taye has \$2 on Monday. Each day he either gains \$3 or doubles his money. How many different amounts could he have on Thursday (3 days later)? A. 3 B. 4 C. 5 D. 6 E. 7
9. Maria's marbles are red, green, blue. Red = half of green; blue = twice green. Which could be the total number of marbles? A. 24 B. 25 C. 26 D. 27 E. 28	10. CO₂ at Mauna Loa was 338 ppm in Jan 1980, increasing ~1.515 ppm/year. Expected level in Jan 2030 (nearest integer)? A. 399 B. 414 C. 420 D. 444 E. 459
11. $\triangle ABC$ with $A(5,7)$, $B(11,7)$, $C(3,y)$, $y > 7$ has area 12. Find y. A. 8 B. 9 C. 10 D. 11 E. 12 	12. Rohan has 90 guppies in 4 tanks. Tank2 = Tank1 + 1; Tank3 = Tank2 + 2; Tank4 = Tank3 + 3. How many in Tank4? A. 20 B. 21 C. 23 D. 24 E. 26

13. Buzz Bunny starts on ground, makes 6 hops (each up or down one step), and ends on ground. How many sequences?

- A. 4
- B. 5
- C. 6
- D. 8
- E. 12

14. One-way routes connect A, M, C, X, Y, Z with given distances. Shortest distance from A to Z?

- A. 28
- B. 29
- C. 30
- D. 31
- E. 32



15. Distinct digits F, L, Y, B, U, G. FLYFLY and BUGBUG are 6-digit numbers with $8 \cdot \text{FLYFLY} = \text{BUGBUG}$. What is $\text{FLY} + \text{BUG}$?

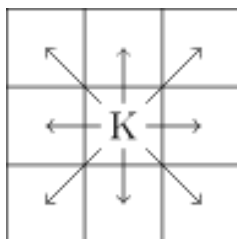
- A. 1089
- B. 1098
- C. 1107
- D. 1116
- E. 1125

16. Numbers 1–81 are placed in a 9×9 grid. For each row/column compute the product. What is the least number of rows/columns whose product is divisible by 3?

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12

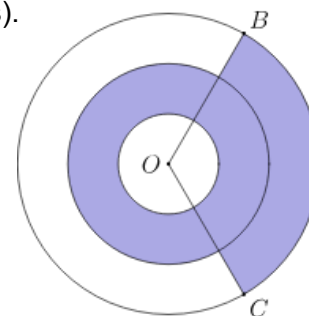
17. Two kings on a 3×3 board on different squares, not attacking each other. In how many ways?

- A. 20
- B. 24
- C. 27
- D. 28
- E. 32



18. Concentric circles radii 1, 2, 3. Annulus (1→2) fully shaded; in outer annulus (2→3) only sector BOC shaded. If shaded area = unshaded area, find $\angle BOC$ (degrees).

- A. 108
- B. 120
- C. 135
- D. 144
- E. 150

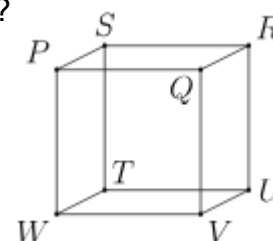


19. Jordan has 15 pairs of sneakers: $\frac{3}{5}$ red, rest white; $\frac{2}{3}$ high-top, rest low-top. What is the least possible fraction that are red high-tops?

- A. 0
- B. $\frac{1}{5}$
- C. $\frac{4}{15}$
- D. $\frac{1}{3}$
- E. $\frac{2}{5}$

20. Cube PQRSTU VW: how many equilateral triangles using 3 vertices that include P?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 6

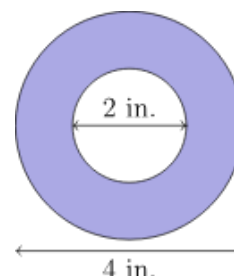


21. A frog turns green in shade, yellow in sun. Initially green:yellow = 3:1. Then 3 green move to sun and 5 yellow move to shade. Now ratio is 4:1. What is the difference (#green – #yellow) now?

- A. 10
- B. 12
- C. 16
- D. 20
- E. 24

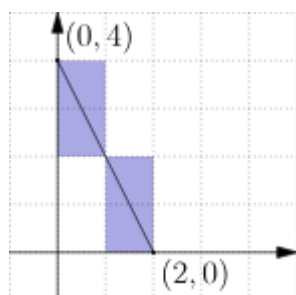
22. A roll of tape: outer diameter 4 in, inner (ring) diameter 2 in, tape thickness 0.015 in. Unrolled length (nearest 100 inches)?

- A. 300
- B. 600
- C. 1200
- D. 1500
- E. 1800



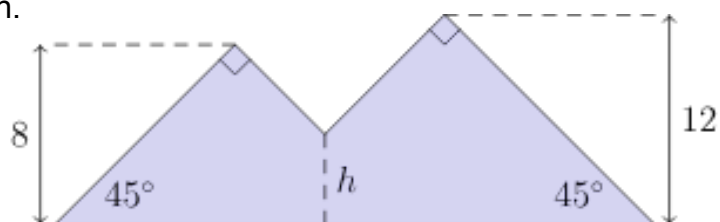
23. Rodrigo colors every unit square whose interior intersects a segment from $(2000, 3000)$ to $(5000, 8000)$. How many squares are colored?

- A. 6000
- B. 6500
- C. 7000
- D. 7500
- E. 8000



24. Two right “mountains” with 90° peaks and 45° sides meet at height h . Peaks are 8 ft and 12 ft. Total area is 183 ft^2 . Find h .

- A. 4
- B. 5
- C. $4\sqrt{2}$
- D. 6
- E. $5\sqrt{2}$



25. Plane has 4 rows $\times$ 3 seats. Eight passengers are seated uniformly at random. A married couple boards next. Probability two adjacent seats in the same row are available?

- A. $8/15$
- B. $32/55$
- C. $20/33$
- D. $34/55$
- E. $8/11$

Answer Key:

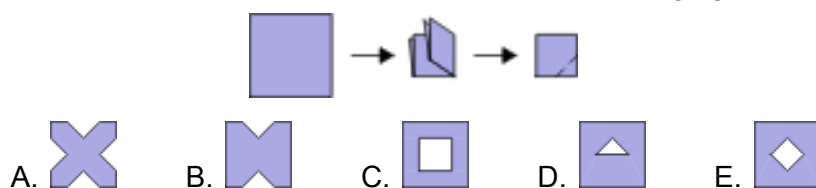
- 1. B
- 2. C
- 3. E
- 4. E
- 5. B
- 6. D
- 7. E
- 8. D
- 9. E
- 10. B
- 11. D
- 12. E
- 13. B
- 14. A
- 15. C
- 16. D
- 17. E
- 18. A
- 19. C
- 20. D
- 21. E
- 22. B
- 23. C
- 24. B
- 25. C

AMC 2023

1. What is the value of $(8 \times 4 + 2) - (8 + 4 \times 2)$?

- A. 0
- B. 6
- C. 10
- D. 18
- E. 24

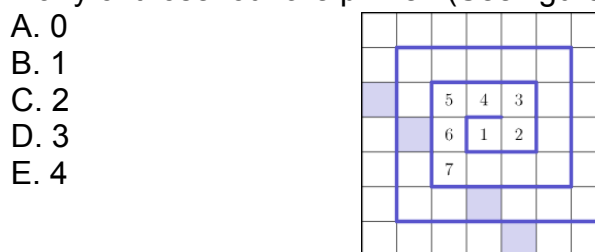
2. A square piece of paper is folded twice into four equal quarters, as shown below, then cut along the dashed line. When unfolded, the paper will match which of the following figures?



3. Wind chill estimate $W = T - 0.7 \cdot S$. If $T = 36^\circ\text{F}$ and $S = 18$ mph, which is closest to W ?

- A. 18
- B. 23
- C. 28
- D. 32
- E. 35

4. Numbers 1–49 are placed in a spiral (center start). On the diagonal with 7, four shaded squares appear. How many of those four are prime? (See figure.)

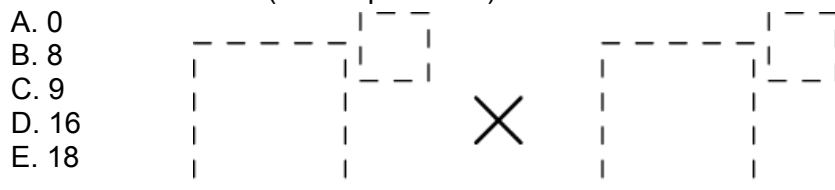


- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

5. A lake has 250 trout. In a catch-and-release sample of 180 fish, 30 are trout. Assuming same ratio in lake and sample, how many fish are in the lake?

- A. 1250
- B. 1500
- C. 1750
- D. 1800
- E. 2000

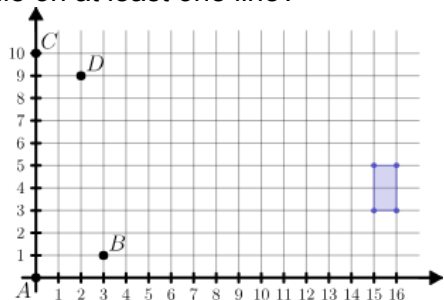
6. Place digits 2, 0, 2, 3 into the expression (one per box) to maximize its value. (See expression.)



- A. 0
- B. 8
- C. 9
- D. 16
- E. 18

7. Rectangle with opposite vertices $(15,3)$ and $(16,5)$. Line through $A(0,0)$ and $B(3,1)$. Another through $C(0,10)$ and $D(2,9)$. How many rectangle points lie on at least one line?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4



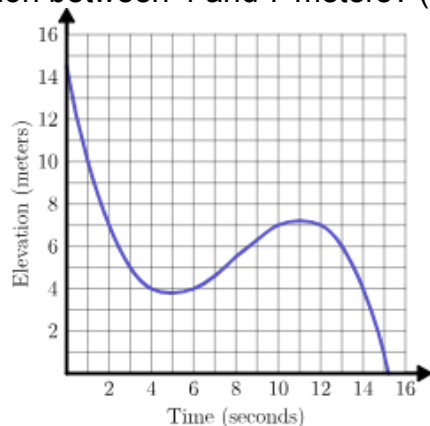
8. Four players (Lola, Lolo, Tiya, Tiyo) each play the others twice. Given three players' win-loss strings (1=win, 0=loss), what is Tiyo's record? (See table.)

- A. 000101
- B. 001001
- C. 010000
- D. 010101
- E. 011000

Player	Result
Lola	111011
Lolo	101010
Tiya	010100
Tiyo	?

9. Skiing elevation vs. time graph: For how many seconds is elevation between 4 and 7 meters? (See graph.)

- A. 6
- B. 8
- C. 10
- D. 12
- E. 14



10. Harold eats $\frac{1}{4}$ of a pie; moose eats $\frac{1}{3}$ of what remains; porcupine eats $\frac{1}{3}$ of what remains then. What fraction of the original pie remains?

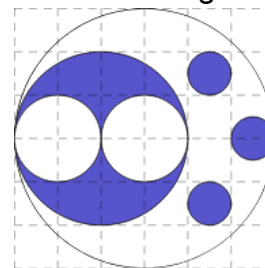
- A. $\frac{1}{12}$
- B. $\frac{1}{6}$
- C. $\frac{1}{4}$
- D. $\frac{1}{3}$
- E. $\frac{5}{12}$

11. Perseverance traveled about 292,526,838 miles in ~6.5 months. Closest average speed (mph)?

- A. 6,000
- B. 12,000
- C. 60,000
- D. 120,000
- E. 600,000

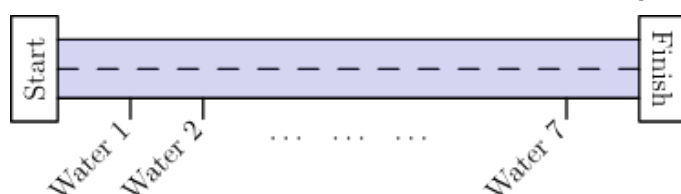
12. In a large circle, some smaller circles are shaded/unshaded inside. What fraction of the big circle's interior is shaded? (See figure.)

- A. $\frac{1}{4}$
- B. $\frac{11}{36}$
- C. $\frac{1}{3}$
- D. $\frac{19}{36}$
- E. $\frac{5}{9}$



13. A race has 7 evenly spaced water stations (so 8 segments) and 2 evenly spaced repair stations (so 3 segments). The 3rd water station is 2 miles after the 1st repair station. Race length?

- A. 8
- B. 16
- C. 24
- D. 48
- E. 96



14. Nicolas has twenty each of 5¢, 10¢, 25¢ stamps. What is the greatest number of stamps to make exactly \$7.10?

- A. 45
- B. 46
- C. 51
- D. 54
- E. 55

15. Visvam walks 10 equal blocks ($\frac{1}{2}$ mile total), 1 min per block. After 5 blocks, a detour makes one segment take 3 blocks instead of 1. From the detour on, what speed (mph) gets him to school on time?

- A. 4
- B. 4.2
- C. 4.5
- D. 4.8
- E. 5



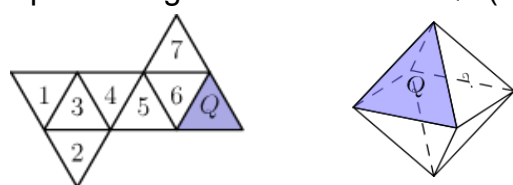
16. Letters P, Q, R fill a 20×20 table by the given pattern. How many of each letter appear? (See pattern.)

- A. 132 P, 134 Q, 134 R
- B. 133 P, 133 Q, 134 R
- C. 133 P, 134 Q, 133 R
- D. 134 P, 132 Q, 134 R
- E. 134 P, 133 Q, 133 R

Q	R	P	Q	R	...
P	Q	R	P	Q	...
R	P	Q	R	P	...
Q	R	P	Q	R	...
P	Q	R	P	Q	...

17. A net folds into a regular octahedron. Which numbered face ends up to the right of shaded face Q? (See net.)

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

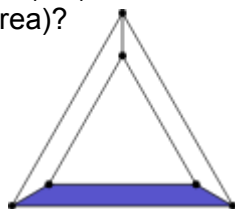


18. Greta Grasshopper can jump +5 pads (right) or -3 pads (left). Fewest jumps to reach pad 2023 to the right?

- A. 405
- B. 407
- C. 409
- D. 411
- E. 413

19. An equilateral triangle inside a larger equilateral triangle creates 3 congruent trapezoids. Inner side = $(\frac{2}{3})$ of outer side. Ratio (one trapezoid area):(inner triangle area)?

- A. 1:3
- B. 3:8
- C. 5:12
- D. 7:16
- E. 4:9



20. Insert two integers into 3,3,8,11,28 to double the range; mode and median unchanged. Maximum possible sum of the two integers?

- A. 56
- B. 57
- C. 58
- D. 60
- E. 61

21. Split cards 1–9 into three groups of three with equal sums. In how many ways can this be done?

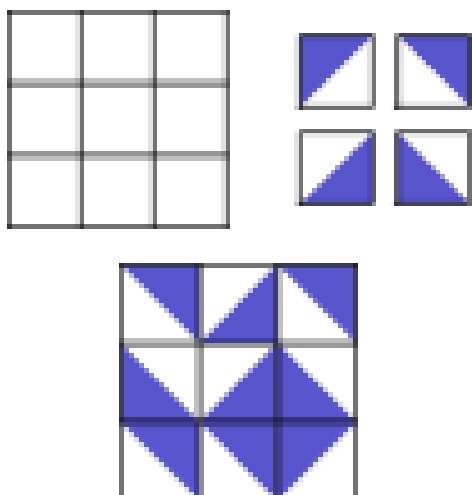
- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

22. Positive-integer sequence: each term after the 2nd equals the product of the previous two. The 6th term is 4000. What is the 1st term?

- A. 1
- B. 2
- C. 4
- D. 5
- E. 10

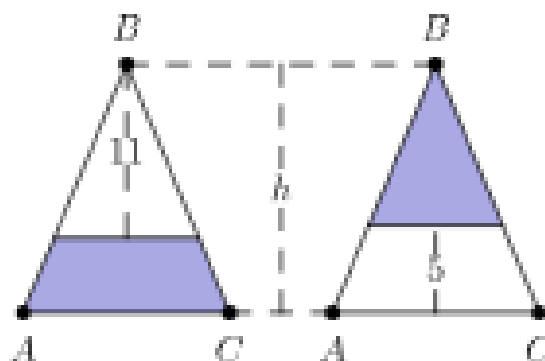
23. Each cell of a 3×3 grid is randomly filled with one of four gray–white tiles (shown). Probability that a 2×2 subgrid forms a large gray diamond? (See example.)

- A. $1/1024$
- B. $1/256$
- C. $1/64$
- D. $1/16$
- E. $1/4$



24. Isosceles $\triangle ABC$ with $AB = BC$. Lines parallel to AC cut off equal shaded areas in two drawings. Heights of the unshaded parts are 11 and 5. What is the height h of $\triangle ABC$?

- A. 14.6
- B. 14.8
- C. 15
- D. 15.2
- E. 15.4



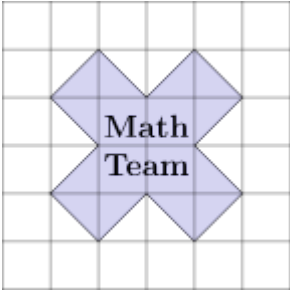
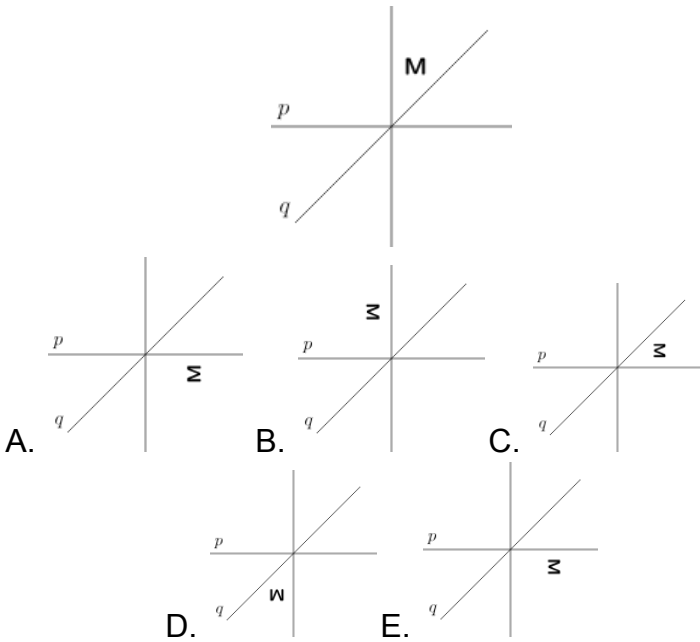
25. Fifteen equally spaced integers $a_1, \dots, a_{15}$ on a number line with $1 \leq a_1 \leq 10$, $13 \leq a_2 \leq 20$, $241 \leq a_{15} \leq 250$. What is the sum of the digits of a_{14} ?

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12

Answer Key:

- 1. D
- 2. E
- 3. B
- 4. D
- 5. B
- 6. C
- 7. B
- 8. A
- 9. B
- 10. D
- 11. C
- 12. B
- 13. D
- 14. E
- 15. B
- 16. C
- 17. A
- 18. D
- 19. C
- 20. D
- 21. C
- 22. D
- 23. C
- 24. A
- 25. A

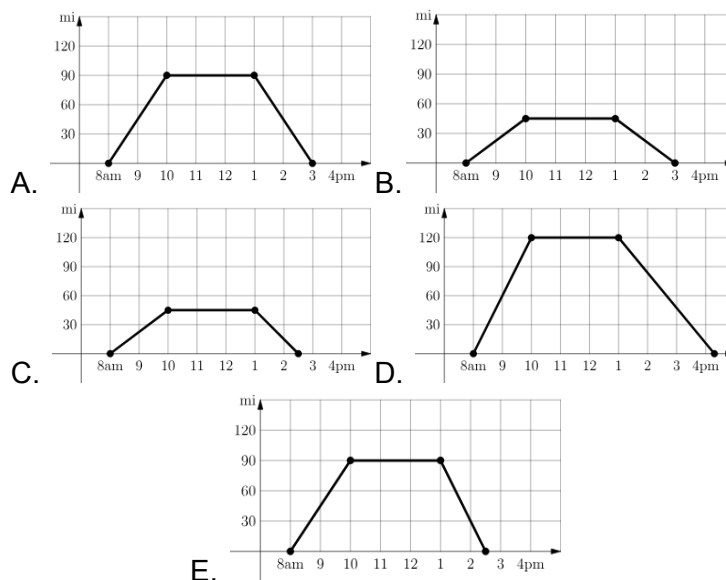
AMC 2022

1. The Math Team logo is a multiplication “X” on 1-inch grid squares. What is its area (in²)? A. 10 B. 12 C. 13 D. 14 E. 15 	2. Let the operations be: $a \diamond b = (aa) - (bb)$ and $a \star b = (a - b)(a + b)$. Compute $(5 \diamond 3) \star 6$. A. -20 B. 4 C. 16 D. 100 E. 220
3. Positive integers $a < b < c$ satisfy $abc = 100$. In how many ways can (a, b, c) be chosen? A. 0 B. 1 C. 2 D. 3 E. 4	4. The letter M is reflected over line q, then over line p. Which image results? (See figures.) 
5. Five years ago Bella turned 6 and got a newborn kitten. Today, the sum of ages of Anna, Bella, and the cat is 30. How many years older than Bella is Anna? A. 1 B. 2 C. 3 D. 4 E. 5	6. Three positive integers are equally spaced on a number line. The middle is 15 and the largest is 4 times the smallest. What is the smallest? A. 4 B. 5 C. 6 D. 7 E. 8
7. Dial-up speed was about 56 kilobits per second. Approximately how many minutes to download a 4.2-megabyte song? (1 megabyte = 8000 kilobits) A. 0.6 B. 10 C. 1800 D. 7200 E. 36000	8. Evaluate the product: $(1/3)(2/4)(3/5) \dots (18/20)(19/21)(20/22)$. A. $1/462$ B. $1/231$ C. $1/132$ D. $2/213$ E. $1/22$

9. Water at 212°F cools in a 68°F room. The temperature difference halves every 5 minutes. What is the water temperature after 15 minutes?

- A. 77
- B. 86
- C. 92
- D. 98
- E. 104

10. Ling leaves at 8 a.m., drives 45 mph to arrive at 10 a.m., hikes 3 hours, then drives home at 60 mph. Which graph shows distance from home over time?

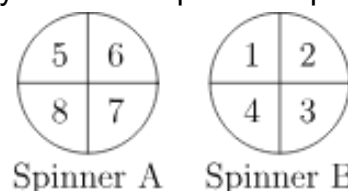


11. Henry bites out 3-inch chunks from the middles of pieces of pasta. He ends with 10 pieces totaling 17 inches. How long was the original piece?

- A. 34
- B. 38
- C. 41
- D. 44
- E. 47

12. Two spinners give tens (A) and ones (B): $N = 10 \cdot A + B$. What is the probability that N is a perfect square?

- A. $1/16$
- B. $1/8$
- C. $1/4$
- D. $3/8$
- E. $1/2$



13. "One positive integer is ___ more than twice another, and their sum is 28." How many integers can fill the blank?

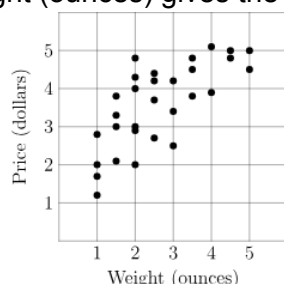
- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

14. How many rearrangements of BEEKEEPER have no two E's adjacent?

- A. 1
- B. 4
- C. 12
- D. 24
- E. 120

15. A scatter plot shows 30 black pepper options (price vs. weight). Which weight (ounces) gives the lowest price per ounce?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5



16. Four numbers a, b, c, d in order: average of a and b is 21; average of b and c is 26; average of c and d is 30. What is the average of a and d?

- A. 24
- B. 25
- C. 26
- D. 27
- E. 28

17. For even n, $n!!$ means $246 \cdot \dots \cdot n$. Find the units digit of $2!! + 4!! + \dots + 2022!!$.

- A. 0
- B. 2
- C. 4
- D. 6
- E. 8

18. The midpoints of a rectangle's sides are at $(-3, 0)$, $(2, 0)$, $(5, 4)$, $(0, 4)$. What is the rectangle's area?

- A. 20
- B. 25
- C. 40
- D. 50
- E. 80

19. A class of 20 has scores shown in a dot plot. After adding 5 points to some tests, the median becomes 85. What is the minimum number of students who received extra points?

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6



20. Fill the grid so each row and column has the same sum. The bottom-left entry x is larger than the other three unknowns. What is the smallest possible x ?

- A. -1
- B. 5
- C. 6
- D. 8
- E. 9

-2	9	5
		-1
x		8

21. Steph made 15/20 in the first half and 10/10 in the second. Candace took 12 in the first, 18 in the second. In each half, Steph's percentage is higher than Candace's, yet their overall percentages match. How many more makes did Candace have in the second half than the first?

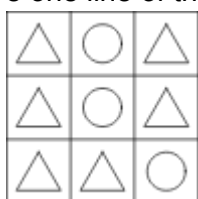
- A. 7
- B. 8
- C. 9
- D. 10
- E. 11

22. A bus takes 2 minutes between stops and waits 1 minute at each stop. Zia takes 5 minutes to walk between stops. They start together toward the library, with the bus 3 stops behind Zia. If Zia reaches a stop and the bus is at or has left the previous stop, she waits; otherwise she walks to the next stop. After how many minutes does Zia board the bus?

- A. 17
- B. 19
- C. 20
- D. 21
- E. 23

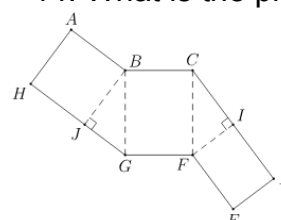
23. Place triangles ($\triangle$) or circles ($\bigcirc$) in each cell of a 3×3 grid. How many configurations have one line of three $\triangle$'s and a (different) line of three $\bigcirc$'s?

- A. 39
- B. 42
- C. 78
- D. 84
- E. 96



24. Net ABCDEFGH folds to a triangular prism. Given $AH = EF = 8$ and $GH = 14$. What is the prism's volume?

- A. 112
- B. 128
- C. 192
- D. 240
- E. 288



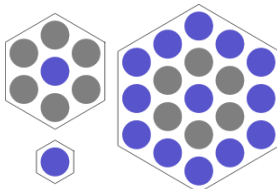
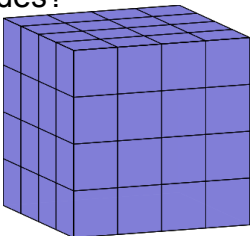
25. A cricket hops among 4 leaves, each hop to a different leaf with equal probability ($1/3$). After 4 hops, what is the probability it's back at its start?

- A. $2/9$
- B. $19/80$
- C. $20/81$
- D. $1/4$
- E. $7/27$

Answer Key:

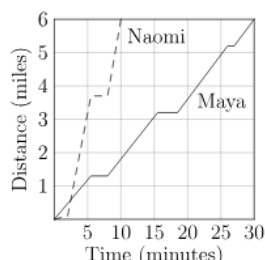
- 1. A
- 2. D
- 3. E
- 4. E
- 5. C
- 6. C
- 7. B
- 8. B
- 9. B
- 10. E
- 11. D
- 12. B
- 13. D
- 14. D
- 15. C
- 16. B
- 17. B
- 18. C
- 19. C
- 20. D
- 21. C
- 22. A
- 23. D
- 24. C
- 25. E

AMC 2020

1. Luka's lemonade recipe needs 4 times as much water as sugar and twice as much sugar as lemon juice. He uses 3 cups of lemon juice. How many cups of water does he need? A. 6 B. 8 C. 12 D. 18 E. 24	2. Four friends earn \$15, \$20, \$25, and \$40 and split equally. How many dollars will the friend who earned \$40 give to the others? A. 5 B. 10 C. 15 D. 20 E. 25
3. Carrie has a 6 ft by 8 ft garden. She plants 4 plants per square foot and gets 10 strawberries per plant. How many strawberries can she expect? A. 560 B. 960 C. 1120 D. 1920 E. 3840	4. Three growing hexagons are shown; each new hexagon adds one band of dots. How many dots are in the next hexagon?  A. 35 B. 37 C. 39 D. 43 E. 49
5. Three-fourths of a pitcher is pineapple juice, poured equally into 5 cups. What percent of the total pitcher did each cup receive? A. 5% B. 10% C. 15% D. 20% E. 25%	6. Five people ride a 5-car train (one per car). Maren is in the last car. Aaron sits directly behind Sharon. Darren is in front of Aaron. At least one person sits between Karen and Darren. Who sits in the middle car? A. Aaron B. Darren C. Karen D. Maren E. Sharon
7. How many integers between 2020 and 2400 have four distinct digits in increasing order (e.g., 2357)? A. 9 B. 10 C. 15 D. 21 E. 28	8. Ricardo has 2020 coins: some pennies (1 cent) and the rest nickels (5 cents). He has at least one of each. What is the difference (in cents) between the greatest possible and least possible total values? A. 8062 B. 8068 C. 8072 D. 8076 E. 8082
9. A $4 \times 4 \times 4$ cake has icing on top and sides, none on the bottom. It's cut into 64 cubes of size $1 \times 1 \times 1$. How many small cubes have icing on exactly two sides?  A. 12 B. 16 C. 18 D. 20 E. 24	10. Zara has 4 marbles: Aggie, Bumblebee, Steelie, Tiger. She displays them in a row but won't put Steelie next to Tiger. In how many ways can she do this? A. 6 B. 8 C. 12 D. 18 E. 24

11. Maya and Naomi travel 6 miles to the beach. Graph shows Naomi does 6 miles in 10 minutes; Maya does 6 miles in 30 minutes. What is the difference in their average speeds (mph)?

- A. 6
- B. 12
- C. 18
- D. 20
- E. 24



12. Factorials: $6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1$. Find N such that $5! \times 9! = 12 \times N!$.

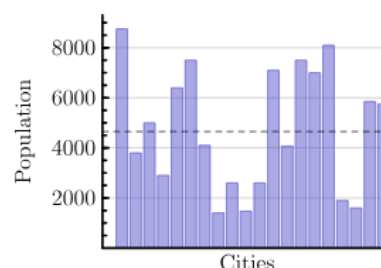
- A. 10
- B. 11
- C. 12
- D. 13
- E. 14

13. Drawer has 6 green, 18 purple, 12 orange socks. After adding some purple socks, the chance of drawing purple is 60%. How many purple socks were added?

- A. 6
- B. 9
- C. 12
- D. 18
- E. 24

14. Bar chart of 20 cities shows average (dashed line) about 4750. Which is closest to the total population of all 20 cities?

- A. 65,000
- B. 75,000
- C. 85,000
- D. 95,000
- E. 105,000

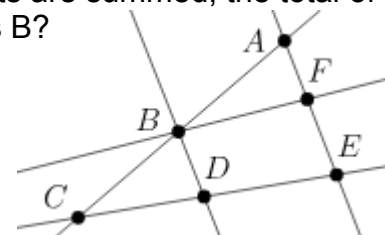


15. Fifteen percent of x equals twenty percent of y. What percent of x is y?

- A. 5%
- B. 35%
- C. 75%
- D. $133 \frac{1}{3}\%$
- E. 300%

16. Points A, B, C, D, E, F are digits 1–6 (all different). Five lines through these points are summed; the total of the five sums is 47. What digit is B?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

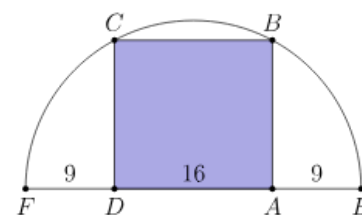


17. How many factors of 2020 have more than 3 factors? (Example: 12 has six factors.)

- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

18. Rectangle ABCD is inscribed in a semicircle with diameter FE. Let $DA = 16$, $FD = AE = 9$. What is the area of ABCD?

- A. 240
- B. 248
- C. 256
- D. 264
- E. 272



19. A five-digit number is “flippy” if its digits alternate between two distinct digits (e.g., 20202). How many five-digit flippy numbers are divisible by 15?

- A. 3
- B. 4
- C. 5
- D. 6
- E. 8

20. Five tree heights in meters are integers in a row; each is either twice or half the one to its right. Known: Tree 2 is 11 m. The scientist reconstructs the rest; the average ends with “.2”. What is the average height?

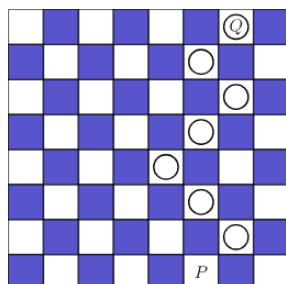
- A. 22.2
- B. 24.2
- C. 33.2
- D. 35.2
- E. 37.2

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

21. On a checkerboard-like grid, starting at P (bottom) and moving up one row per step to adjacent blanks (up-left or up-right), how many 7-step paths reach Q (top)?

- A. 28
- B. 30
- C. 32
- D. 33
- E. 35



22. Machine rule: if N is even $\rightarrow N/2$; if N is odd $\rightarrow 3N+1$. Starting from N , apply the machine 6 times to end at 1. What is the sum of all such starting N ?

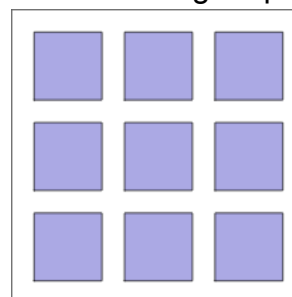
- A. 73
- B. 74
- C. 75
- D. 82
- E. 83

23. Five different awards are given to three students, each student gets at least one award. In how many ways can the awards be distributed?

- A. 120
- B. 150
- C. 180
- D. 210
- E. 240

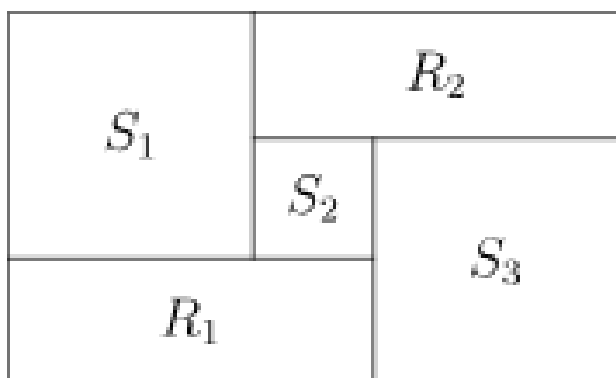
24. A large square is paved with n^2 gray $s \times s$ tiles, with borders of width d around each tile. For $n = 24$, the 576 gray tiles cover 64% of the large square. What is d/s ?

- A. $6/25$
- B. $1/4$
- C. $9/25$
- D. $7/16$
- E. $9/16$



25. Rectangles R_1 , R_2 and squares S_1 , S_2 , S_3 form a 3322-by-2020 rectangle. What is the side length of S_2 ?

- A. 651
- B. 655
- C. 656
- D. 662
- E. 666



Answer Key:

- 1. E
- 2. C
- 3. D
- 4. B
- 5. C
- 6. A
- 7. C
- 8. C
- 9. D
- 10. C
- 11. E
- 12. A
- 13. B
- 14. D
- 15. C
- 16. E
- 17. B
- 18. A
- 19. B
- 20. B
- 21. A
- 22. E
- 23. B
- 24. A
- 25. A

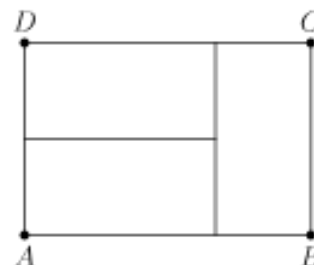
AMC 2019

1. Ike and Mike have \$30 to spend. Sandwiches cost \$4.50 each and soft drinks cost \$1 each. They buy as many sandwiches as possible and spend the rest on drinks. How many total items do they buy?

- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

2. Three identical rectangles form rectangle ABCD. The short side of each small rectangle is 5 ft. What is the area of ABCD (square feet)?

- A. 45
- B. 75
- C. 100
- D. 125
- E. 150

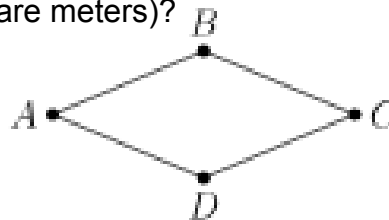


3. Order the fractions $\frac{15}{11}$, $\frac{19}{15}$, $\frac{11}{15}$, $\frac{15}{19}$, and $\frac{17}{13}$ from least to greatest.

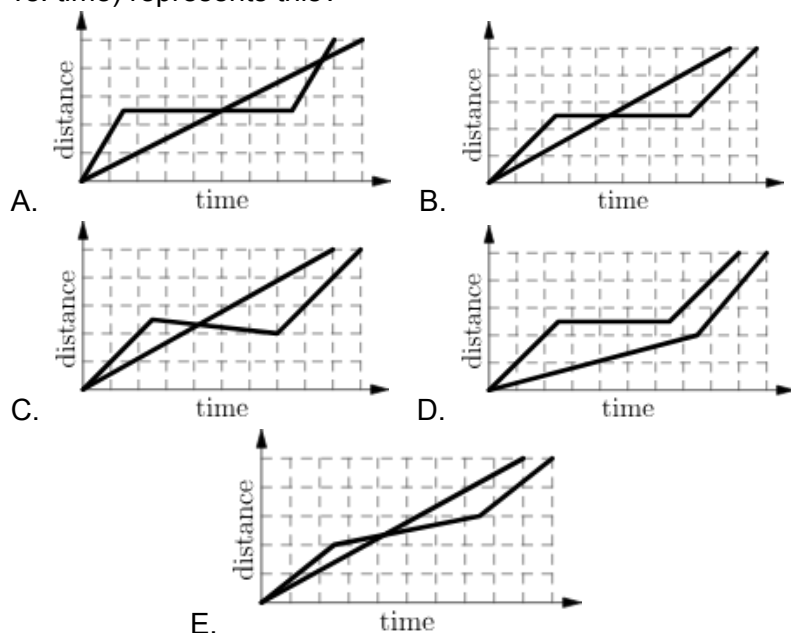
- A. $\frac{15}{11} < \frac{17}{13} < \frac{19}{15} < \frac{11}{15} < \frac{15}{19}$
- B. $\frac{15}{11} < \frac{19}{15} < \frac{17}{13} < \frac{15}{19} < \frac{11}{15}$
- C. $\frac{17}{13} < \frac{19}{15} < \frac{15}{11} < \frac{15}{19} < \frac{11}{15}$
- D. $\frac{19}{15} < \frac{15}{11} < \frac{17}{13} < \frac{15}{19} < \frac{11}{15}$
- E. $\frac{19}{15} < \frac{17}{13} < \frac{15}{11} < \frac{13}{17} < \frac{11}{15}$

4. Rhombus ABCD has perimeter 52 m. Diagonal AC is 24 m. What is its area (square meters)?

- A. 60
- B. 90
- C. 105
- D. 120
- E. 144

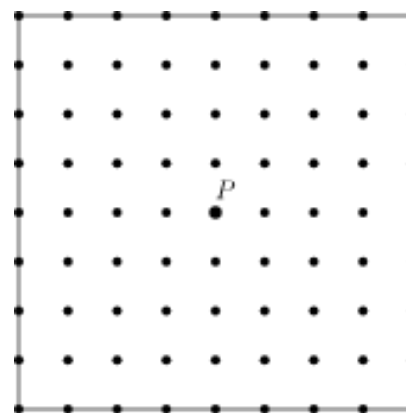


5. A hare and a tortoise race. The hare runs ahead, naps midway, then finishes after the tortoise. Which graph (distance vs. time) represents this?



6. A 9×9 grid has 81 equally spaced points. P is the center. Q is randomly chosen from the other 80 points. What is the probability that line PQ is a line of symmetry of the square?

- A. $\frac{1}{5}$
- B. $\frac{1}{4}$
- C. $\frac{2}{5}$
- D. $\frac{9}{20}$
- E. $\frac{1}{2}$



7. Shauna takes five 100-point tests. Her first three scores are 76, 94, and 87. To average 81 overall, what is the lowest score she could earn on one of the last two tests?

- A. 48
- B. 52
- C. 66
- D. 70
- E. 74

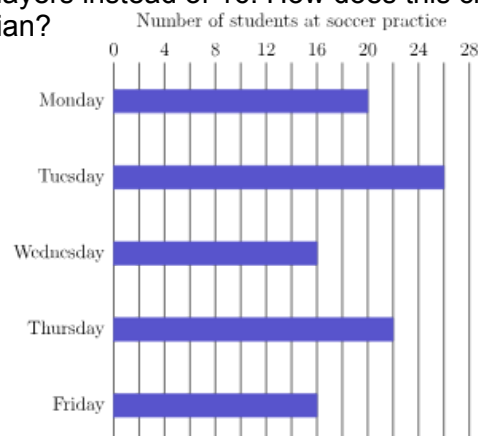
8. Gilda gives away 20% of her marbles to Pedro, then 10% of the remainder to Ebony, then 25% of what's left to Jimmy. What percent of her original marbles does she have left?

- A. 20
- B. $33 \frac{1}{3}$
- C. 38
- D. 45
- E. 54

9. Alex's cat food cans are 6 cm in diameter and 12 cm high. Felicia's are 12 cm in diameter and 6 cm high. What is the ratio of Alex's can volume to Felicia's?

- A. 1:4
- B. 1:2
- C. 1:1
- D. 2:1
- E. 4:1

10. The coach learns that Wednesday's soccer practice actually had 21 players instead of 16. How does this change the mean and median?



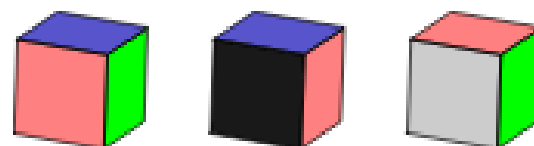
- A. Mean increases by 1; median unchanged
- B. Mean increases by 1; median increases by 1
- C. Mean increases by 1; median increases by 5
- D. Mean increases by 5; median increases by 1
- E. Mean increases by 5; median increases by 5

11. Lincoln Middle has 93 eighth graders. 70 take math, 54 take a language, and all take at least one. How many take only math?

- A. 16
- B. 23
- C. 31
- D. 39
- E. 70

12. A cube's faces are painted red, white, green, purple, yellow, and black. Based on the views shown, what color is opposite yellow?

- A. Red
- B. White
- C. Green
- D. Purple
- E. Black



13. A palindrome reads the same backward. What is the sum of the digits of the smallest 3-digit non-palindrome that is the sum of three distinct 2-digit palindromes?

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6

14. Isabella has 6 coupons for free ice cream. She redeems one every 10 days, and no redemption date falls on a Sunday. On which weekday does she start?

- A. Monday
- B. Tuesday
- C. Wednesday
- D. Thursday
- E. Friday

15. On a beach, 50 people wear sunglasses and 35 wear caps. If $\frac{2}{5}$ of cap-wearers also wear sunglasses, what is the probability that a sunglasses-wearer also wears a cap?

- A. $\frac{14}{85}$
- B. $\frac{7}{25}$
- C. $\frac{2}{5}$
- D. $\frac{4}{7}$
- E. $\frac{7}{10}$

16. Qiang drives 15 miles at 30 mph. How many more miles must he drive at 55 mph to average 50 mph total?

- A. 45
- B. 62
- C. 90
- D. 110
- E. 135

17. Evaluate the product:
 $(1 \times 3) / (2 \times 2) \times (2 \times 4) / (3 \times 3) \times (3 \times 5) / (4 \times 4) \times \dots \times (98 \times 100) / (99 \times 99)$.

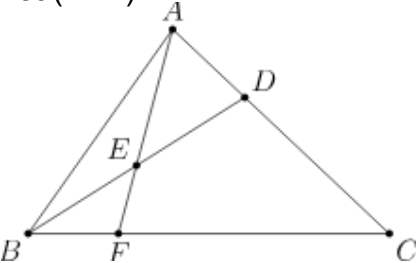
- A. $\frac{1}{2}$
- B. $\frac{50}{99}$
- C. $\frac{9800}{9801}$
- D. $\frac{100}{99}$
- E. 50

18. Two dice each have faces 1, 2, 3, 5, 7, 8. Rolled together, what is the probability the sum is even?

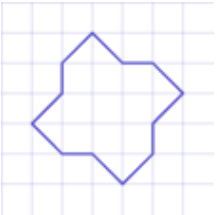
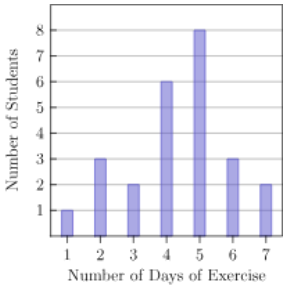
- A. $\frac{4}{9}$
- B. $\frac{1}{2}$
- C. $\frac{5}{9}$
- D. $\frac{3}{5}$
- E. $\frac{2}{3}$

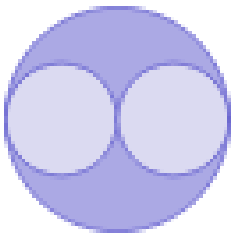
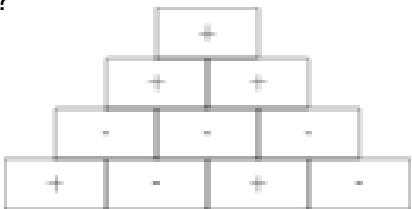
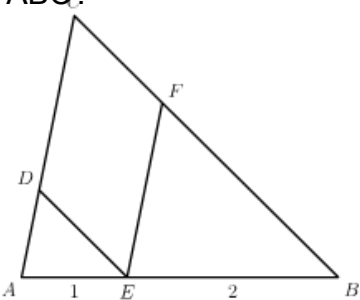
AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

19. Six teams play each other twice. A win = 3 points, draw = 1. The top three teams have equal points. What is the greatest possible total for each top team? A. 22 B. 23 C. 24 D. 26 E. 30	20. How many real values of x satisfy $(x^2 - 5)^2 = 16$? A. 0 B. 1 C. 2 D. 4 E. 8
21. Find the area of the triangle formed by the lines $y = 5$, $y = 1 + x$, and $y = 1 - x$. A. 4 B. 8 C. 10 D. 12 E. 16	22. A store raises a shirt's price by $x\%$ then reduces it by $x\%$. The final price is 84% of the original. What is x? A. 16 B. 20 C. 28 D. 36 E. 40
23. Alexa scored $\frac{1}{4}$ of a team's points, Brittany $\frac{2}{7}$, Chelsea 15 points. No other 7 teammates scored more than 2 each. How many points did those 7 score together? A. 10 B. 11 C. 12 D. 13 E. 14	24. In triangle ABC, D divides AC so $AD:DC = 1:2$. E is the midpoint of BD, and F is the intersection of AE and BC. If $\text{area}(ABC) = 360$, what is $\text{area}(EBF)$? A. 24 B. 30 C. 32 D. 36 E. 40 
25. Alice has 24 apples. In how many ways can she share them with Becky and Chris if each gets at least 2? A. 105 B. 114 C. 190 D. 210 E. 380	Answer Key: - D - E - E - D - B - C - A - E - B - B - D - A - A - C - B - D - B - C - C - D - E - E - B - B - C

AMC 2018

1. An amusement park has a collection of scale models, with a ratio of 1:20. The height of the United States Capitol is 289 feet. What is the height in feet of its replica at this park, rounded to the nearest whole number? A. 14 B. 15 C. 16 D. 18 E. 20	2. What is the value of the product $(1 + 1/1) \times (1 + 1/2) \times (1 + 1/3) \times (1 + 1/4) \times (1 + 1/5) \times (1 + 1/6)$? A. $7/6$ B. $4/3$ C. $7/2$ D. 7 E. 8
3. Students Arn, Bob, Cyd, Dan, Eve, and Fon are arranged in a circle. They start counting; when the number contains a 7 or is a multiple of 7, that person leaves the circle. Who is the last one present? A. Arn B. Bob C. Cyd D. Dan E. Eve	4. A twelve-sided figure is drawn on 1 cm $\times$ 1 cm graph paper. What is the area of the figure in square centimeters? A. 12 B. 12.5 C. 13 D. 13.5 E. 14 
5. What is the value of $1 + 3 + 5 + \dots + 2017 + 2019 - 2 - 4 - 6 - \dots - 2016 - 2018$? A. -1010 B. -1009 C. 1008 D. 1009 E. 1010	6. On a trip to the beach, Anh traveled 50 miles on the highway and 10 miles on a coastal road. He drove three times as fast on the highway as on the coastal road. If Anh spent 30 minutes driving on the coastal road, how many minutes did his entire trip take? A. 50 B. 70 C. 80 D. 90 E. 100
7. The 5-digit number 2018U is divisible by 9. What is the remainder when this number is divided by 8? A. 1 B. 3 C. 5 D. 6 E. 7	8. Mr. Garcia asked students how many days last week they exercised at least 30 minutes. Based on the bar graph (with totals of 1 one-day, 3 two-days, 2 three-days, 6 four-days, 8 five-days, 3 six-days, and 2 seven-days), what was the mean number of days of exercise, rounded to the nearest hundredth?  A. 3.50 B. 3.57 C. 4.36 D. 4.50 E. 5.00
9. Tyler is tiling a 12 ft by 16 ft floor. He uses 1$\times$1 tiles for the border and 2$\times$2 tiles for the inside. How many tiles will he use in total? A. 48 B. 87 C. 91 D. 96 E. 120	10. The harmonic mean of 1, 2, and 4 is defined as the reciprocal of the average of their reciprocals. What is the harmonic mean? A. $3/7$ B. $7/12$ C. $12/7$ D. $7/4$ E. $7/3$

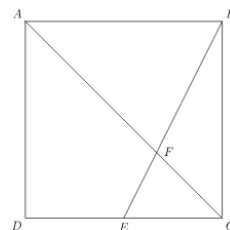
11. Abby, Bridget, and four classmates are seated randomly in two rows of three. What is the probability Abby and Bridget are adjacent in the same row or column? A. $\frac{1}{3}$ B. $\frac{2}{5}$ C. $\frac{7}{15}$ D. $\frac{1}{2}$ E. $\frac{2}{3}$	12. A car clock gains time at a constant rate. When Sri starts shopping, both his watch and car clock show 12:00. After 30 minutes, the car clock shows 12:35. Later, his car clock shows 7:00. What is the actual time? A. 5:50 B. 6:00 C. 6:30 D. 6:55 E. 8:10
13. Laila took five math tests (max 100 points each). She got the same score on the first four and a higher score on the last one. Her average was 82. How many possible values are there for her last test score? A. 4 B. 5 C. 9 D. 10 E. 18	14. Let N be the largest 5-digit number whose digits have a product of 120. What is the sum of the digits of N? A. 15 B. 16 C. 17 D. 18 E. 20
15. In the diagram, the diameter of each small circle equals the radius of the large circle. The two small circles have a combined area of 1 square unit. What is the area of the shaded region? A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. 1 E. $\frac{\pi}{2}$ 	16. Professor Chang has nine language books: two Arabic, three German, and four Spanish. How many ways can the books be arranged if all Arabic books stay together and all Spanish books stay together? A. 1440 B. 2880 C. 5760 D. 182,440 E. 362,880
17. Bella walks from her house to Ella's while Ella rides toward her. Ella rides 5 times faster than Bella walks. The distance is 2 miles (10,560 feet), and Bella takes 2.5 feet per step. How many steps will Bella take before meeting Ella? A. 704 B. 845 C. 1056 D. 1760 E. 3520	18. How many positive factors does 23,232 have? A. 9 B. 12 C. 28 D. 36 E. 42
19. In a sign pyramid, each cell is "+" if the two below it have the same sign and "-" if they are different. For a 4-level pyramid, how many possible ways can the bottom row be filled to produce a "+" at the top? A. 2 B. 4 C. 8 D. 12 E. 16 	20. In triangle ABC, E divides AB so $AE=1$ and $EB=2$. D is on AC so $DE \parallel BC$, and F is on BC so $EF \parallel AC$. What is the ratio of the area of CDEF to ABC? A. $\frac{4}{9}$ B. $\frac{1}{2}$ C. $\frac{5}{9}$ D. $\frac{3}{5}$ E. $\frac{2}{3}$ 

21. How many 3-digit integers leave a remainder of 2 when divided by 6, a remainder of 5 when divided by 9, and a remainder of 7 when divided by 11?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

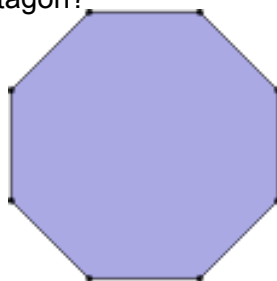
22. In square ABCD, E is the midpoint of CD, and BE meets diagonal AC at F. If $\text{area}(\triangle AFE) = 45$, what is the area of ABCD?

- A. 100
- B. 108
- C. 120
- D. 135
- E. 144



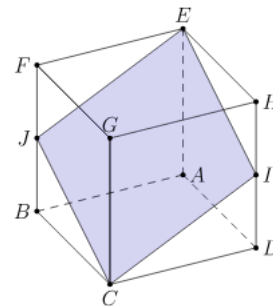
23. From a regular octagon, a triangle is formed by connecting three random vertices. What is the probability that at least one side of the triangle is also a side of the octagon?

- A. $\frac{2}{7}$
- B. $\frac{5}{42}$
- C. $\frac{11}{14}$
- D. $\frac{5}{7}$
- E. $\frac{6}{7}$



24. In cube ABCDEFGH with opposite vertices C and E, points J and I are midpoints of FB and HD. Let R be the ratio of the area of cross-section EJCI to one face of the cube. What is R squared?

- A. $\frac{5}{4}$
- B. $\frac{4}{3}$
- C. $\frac{3}{2}$
- D. $\frac{25}{16}$
- E. $\frac{9}{4}$



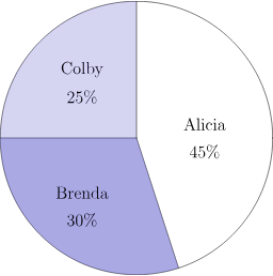
25. How many perfect cubes lie between $2^8 + 1$ and $2^{18} + 1$ inclusive?

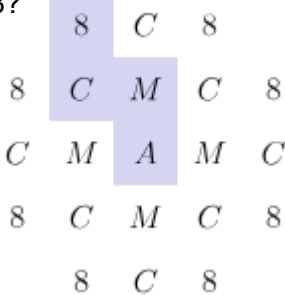
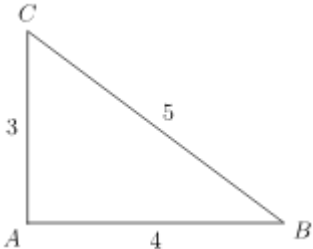
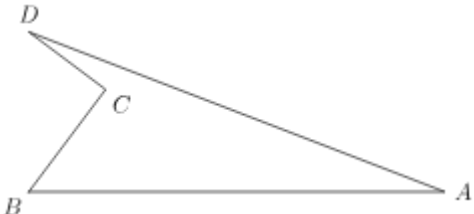
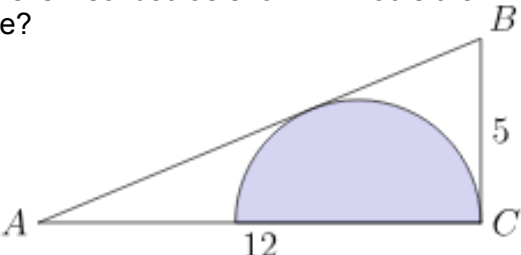
- A. 4
- B. 9
- C. 10
- D. 57
- E. 58

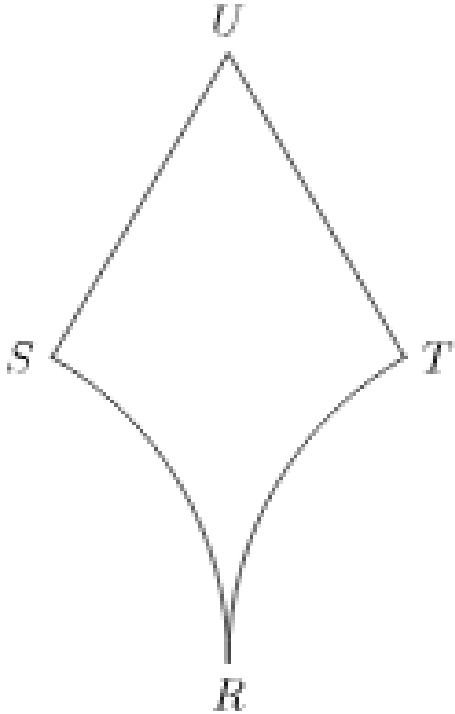
Answer Key:

- 1. A
- 2. D
- 3. D
- 4. C
- 5. E
- 6. C
- 7. B
- 8. C
- 9. B
- 10. C
- 11. C
- 12. B
- 13. A
- 14. D
- 15. D
- 16. C
- 17. A
- 18. E
- 19. C
- 20. A
- 21. E
- 22. B
- 23. D
- 24. C
- 25. E

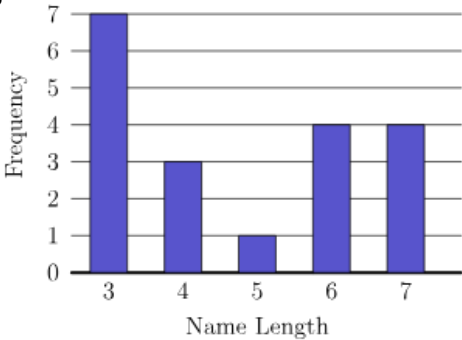
AMC 2017

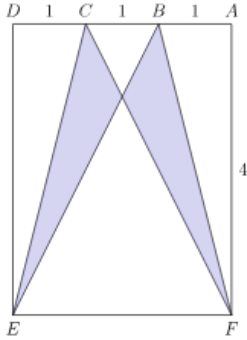
1. Which of the following values is largest? A. $2 + 0 + 1 + 7$ B. $2 \times 0 + 1 + 7$ C. $2 + 0 \times 1 + 7$ D. $2 + 0 + 1 \times 7$ E. $2 \times 0 \times 1 \times 7$	2. Alicia, Brenda, and Colby were the candidates in a recent election. The pie chart shows vote distribution. If Brenda received 36 votes, how many votes were cast in total? A. 70 B. 84 C. 100 D. 106 E. 120 
3. What is the value of the expression $16 \div 8 \times 4$? A. 4 B. $4 \div 2$ C. 8 D. $8 \div 2$ E. 16	4. When 0.000315 is multiplied by 7,928,564, the product is closest to which of the following? A. 210 B. 240 C. 2100 D. 2400 E. 24000
5. What is the value of $(1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8) \div (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8)$? A. 1020 B. 1120 C. 1220 D. 2240 E. 3360	6. If the angles of a triangle are in the ratio 3:3:4, what is the degree measure of the largest angle? A. 18 B. 36 C. 60 D. 72 E. 90
7. Let Z be a 6-digit integer such that the first three digits are the same as the last three. Which of the following numbers must be a factor of Z? A. 11 B. 19 C. 101 D. 111 E. 1111	8. Isabella's house number has two digits, and exactly three of the following are true: (1) It is prime (2) It is even (3) It is divisible by 7 (4) One of its digits is 9 What is the units digit of her house number? A. 4 B. 6 C. 7 D. 8 E. 9
9. Marcy's marbles are blue, red, green, or yellow. One-third are blue, one-fourth are red, and six are green. What is the smallest number of yellow marbles she could have? A. 1 B. 2 C. 3 D. 4 E. 5	10. A box has cards numbered 1–5. Three are selected at random without replacement. What is the probability that 4 is the largest value selected? A. $1/10$ B. $1/5$ C. $3/10$ D. $2/5$ E. $1/2$

11. A square floor is covered with square tiles. If 37 tiles lie on the two diagonals, how many tiles cover the floor? A. 148 B. 324 C. 361 D. 1296 E. 1369	12. The smallest positive integer greater than 1 that leaves a remainder of 1 when divided by 4, 5, and 6 lies between which of the following pairs of numbers? A. 2 and 19 B. 20 and 39 C. 40 and 59 D. 60 and 79 E. 80 and 124
13. Peter won 4 games and lost 2, Emma won 3 and lost 3, and Kyler lost 3. How many games did Kyler win? A. 0 B. 1 C. 2 D. 3 E. 4	14. Chloe solved half her homework alone (80% correct) and half with Zoe (overall 88% correct). Zoe solved 90% correctly alone. What was Zoe's overall percent correct? A. 89 B. 92 C. 93 D. 96 E. 98
15. In the grid spelling AMC8, starting at the middle A and moving only up, down, left, or right (not diagonal), how many paths can spell AMC8? A. 8 B. 9 C. 12 D. 24 E. 36 	16. In triangle ABC, choose D on BC so triangles ACD and ABD have equal perimeters. What is the area of triangle ABD? A. $\frac{3}{4}$ B. $\frac{3}{2}$ C. 2 D. $\frac{12}{5}$ E. $\frac{5}{2}$ 
17. I tried to put 9 gold coins in each chest, leaving 2 chests empty. When I put 6 in each chest, I had 3 coins left. How many gold coins did I have? A. 9 B. 27 C. 45 D. 63 E. 81	18. In nonconvex quadrilateral ABCD, angle BCD = 90°, AB = 12, BC = 4, CD = 3, and AD = 13. What is the area of ABCD? A. 12 B. 24 C. 26 D. 30 E. 36 
19. What is the largest integer n for which 5^n divides $98! + 99! + 100!$? A. 23 B. 24 C. 25 D. 26 E. 27	20. A 4-digit integer between 1000 and 9999 is chosen at random. What is the probability that it is odd and all its digits are distinct? A. $\frac{14}{75}$ B. $\frac{56}{225}$ C. $\frac{107}{400}$ D. $\frac{7}{25}$ E. $\frac{9}{25}$
21. Suppose $a + b + c = 0$ for nonzero real numbers a, b, c. What are the possible values of $(\frac{a}{ a } + \frac{b}{ b } + \frac{c}{ c } + \frac{abc}{ abc })$? A. 0 B. 1 and -1 C. 2 and -2 D. 0, 2, and -2 E. 0, 1, and -1	22. In right triangle ABC with AC = 12, BC = 5, and right angle at C, a semicircle is inscribed as shown. What is the radius of the semicircle? A. $\frac{7}{6}$ B. $\frac{13}{5}$ C. $\frac{59}{18}$ D. $\frac{10}{3}$ E. $\frac{60}{13}$ 

23. Linda traveled 1 hour each day for four days. Each day, her speed (mph) decreased so that minutes per mile increased by 5 each day. Each day's distance was an integer. What was her total distance over 4 days? A. 10 B. 15 C. 25 D. 50 E. 82	24. Mrs. Sanders has three grandchildren who call every 3, 4, and 5 days. All called on Dec 31, 2016. How many days in 2017 did she receive no calls? A. 78 B. 80 C. 144 D. 146 E. 152
25. In the figure, US and UT are each 2 units, and angle $TUS = 60^\circ$. Arcs TR and SR are each one-sixth of a circle with radius 2. What is the area of the region shown? A. $3 - \pi$ B. $\frac{4}{3} - \frac{4\pi}{3}$ C. $\frac{2}{3}$ D. $\frac{4}{3} - \frac{2\pi}{3}$ E. $4 + \frac{4\pi}{3}$ 	Answer Key: 1. A 2. E 3. C 4. D 5. B 6. D 7. A 8. D 9. D 10. C 11. C 12. D 13. B 14. C 15. D 16. D 17. C 18. B 19. D 20. B 21. A 22. D 23. C 24. D 25. B

AMC 2016

1. The longest professional tennis match lasted 11 hours and 5 minutes. How many minutes was this? A. 605 B. 655 C. 665 D. 1005 E. 1105	2. In rectangle ABCD, $AB = 6$ and $AD = 8$. M is the midpoint of AD. What is the area of triangle AMC? A. 12 B. 15 C. 18 D. 20 E. 24												
3. Four students take an exam. Three of their scores are 70, 80, and 90. If their average score is 70, what is the remaining score? A. 40 B. 50 C. 55 D. 60 E. 70	4. When Cheenu was a boy he ran 15 miles in 3 hours and 30 minutes. Now he walks 10 miles in 4 hours. How many minutes longer does it take him to walk a mile now than it did when he was a boy? A. 6 B. 10 C. 15 D. 18 E. 30												
5. The number N is two digits. When N is divided by 9, the remainder is 1. When divided by 10, the remainder is 3. What is the remainder when N is divided by 11? A. 0 B. 2 C. 4 D. 5 E. 7	6. A bar graph shows the name lengths (in letters) of 19 people. What is the median length? A. 3 B. 4 C. 5 D. 6 E. 7  <table border="1"> <caption>Bar Graph Data</caption> <thead> <tr> <th>Name Length</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>7</td> </tr> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>5</td> <td>1</td> </tr> <tr> <td>6</td> <td>4</td> </tr> <tr> <td>7</td> <td>4</td> </tr> </tbody> </table>	Name Length	Frequency	3	7	4	3	5	1	6	4	7	4
Name Length	Frequency												
3	7												
4	3												
5	1												
6	4												
7	4												
7. Which of the following numbers is not a perfect square? A. 2016 B. 2017 C. 2018 D. 2019 E. 2020	8. Find the value of $100 - 98 + 96 - 94 + 92 - 90 + \dots + 8 - 6 + 4 - 2$. A. 20 B. 40 C. 50 D. 80 E. 100												
9. What is the sum of the distinct prime factors of 2016? A. 9 B. 12 C. 16 D. 49 E. 63	10. Suppose $a * b = 3a - b$. What is x if $2 * (5 * x) = 1$? A. $1/10$ B. 2 C. $10/3$ D. 10 E. 14												

11. How many two-digit numbers satisfy this: when added to their reversed-digit number, the sum equals 132? A. 5 B. 7 C. 9 D. 11 E. 12	12. Jefferson Middle School has equal numbers of boys and girls. Three-fourths of the girls and two-thirds of the boys went on a field trip. What fraction of students on the trip were girls? A. $\frac{1}{2}$ B. $\frac{9}{17}$ C. $\frac{7}{13}$ D. $\frac{2}{3}$ E. $\frac{14}{15}$
13. Two different numbers are selected from $\{-2, -1, 0, 3, 4, 5\}$ and multiplied. What is the probability that their product is 0? A. $\frac{1}{6}$ B. $\frac{1}{5}$ C. $\frac{1}{4}$ D. $\frac{1}{3}$ E. $\frac{1}{2}$	14. Karl's car gets 35 miles per gallon and holds 14 gallons. Starting full, he drove 350 miles, bought 8 gallons, and arrived with the tank half full. How many miles did Karl drive in total? A. 525 B. 560 C. 595 D. 665 E. 735
15. What is the largest power of 2 that divides $13^4 - 11^4$? A. 8 B. 16 C. 32 D. 64 E. 128	16. Annie runs 25% faster than Bonnie on a 400 m track. How many laps will Annie have run when she first passes Bonnie? A. $1 \frac{1}{4}$ B. $3 \frac{1}{3}$ C. 4 D. 5 E. 25
17. An ATM password has 4 digits (0–9). If no password may begin with 9, 1, 1, how many passwords are possible? A. 30 B. 7290 C. 9000 D. 9990 E. 9999	18. A 100 m race has 216 sprinters and 6 lanes. In each race, the 5 non-winners are eliminated. How many races are needed to determine a champion? A. 36 B. 42 C. 43 D. 60 E. 72
19. The sum of 25 consecutive even integers is 10,000. What is the largest integer in the list? A. 360 B. 388 C. 412 D. 416 E. 424	20. The least common multiple of a and b is 12, and the least common multiple of b and c is 15. What is the least possible LCM of a and c? A. 20 B. 30 C. 60 D. 120 E. 180
21. A hat has 3 red and 2 green chips. Chips are drawn without replacement until all 3 reds or both greens are drawn. What is the probability all 3 reds are drawn? A. $\frac{3}{10}$ B. $\frac{2}{5}$ C. $\frac{1}{2}$ D. $\frac{3}{5}$ E. $\frac{2}{3}$	22. Rectangle DEFA is 3×4, with $DC = CB = BA = 1$. What is the area of the shaded "bat wings"? A. 2 B. $2 \frac{1}{2}$ C. 3 D. $3 \frac{1}{2}$ E. 5 

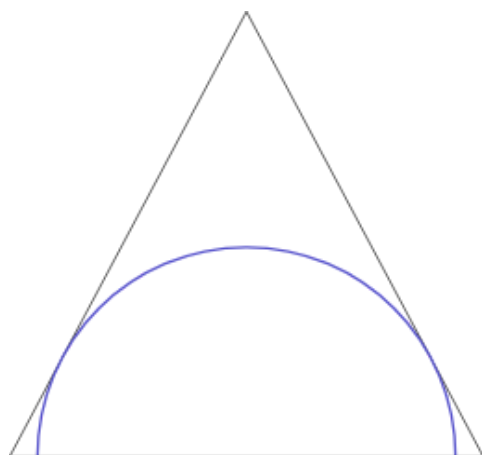
AI HOMEWORK

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23. Two congruent circles centered at A and B each pass through the other's center. Line AB meets the circles again at C and D. The circles intersect at E. What is the measure of angle CED?
- 90
 - 105
 - 120
 - 135
 - 150

24. Using digits 1, 2, 3, 4, 5 each once to make PQRS:
PQR is divisible by 4
QRS is divisible by 5
RST is divisible by 3
What is P?
- 1
 - 2
 - 3
 - 4
 - 5

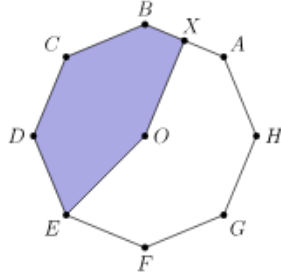
25. A semicircle is inscribed in an isosceles triangle with base 16 and height 15, with the diameter on the base. What is the radius of the semicircle?
- $\frac{4}{3}$
 - $\frac{120}{17}$
 - 10
 - $\frac{17}{2}$
 - $\frac{17}{3}$



Answer Key:

- C
- A
- A
- B
- E
- B
- B
- C
- B
- D
- B
- B
- D
- A
- C
- D
- D
- C
- E
- A
- B
- C
- C
- A
- B

AMC 2015

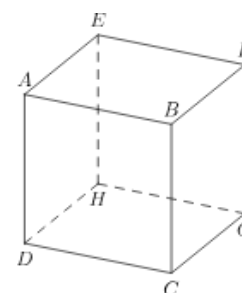
1. How many square yards of red carpet are required to cover a rectangular floor that is 12 feet long and 9 feet wide? (There are 3 feet in a yard.) A. 12 B. 36 C. 108 D. 324 E. 972	2. Point O is the center of the regular octagon ABCDEFGH, and X is the midpoint of side AB. What fraction of the area of the octagon is shaded? A. $\frac{11}{32}$ B. $\frac{3}{8}$ C. $\frac{13}{32}$ D. $\frac{7}{16}$ E. $\frac{15}{32}$ 
3. Jack and Jill are going swimming at a pool that is one mile from their house. They leave home simultaneously. Jill rides her bicycle to the pool at a constant speed of 10 miles per hour. Jack walks to the pool at a constant speed of 4 miles per hour. How many minutes before Jack does Jill arrive? A. 5 B. 6 C. 8 D. 9 E. 10	4. The Centerville High School chess team consists of two boys and three girls. A photographer wants to take a picture of the team to appear in the local newspaper. She decides to have them sit in a row with a boy at each end and the three girls in the middle. How many such arrangements are possible? A. 2 B. 4 C. 5 D. 6 E. 12
5. Billy's basketball team scored the following points over the first 11 games: 42, 47, 53, 53, 58, 58, 58, 61, 64, 65, 73. If his team scores 40 in the 12th game, which statistic will show an increase? A. range B. median C. mean D. mode E. mid-range	6. In $\triangle ABC$, $AB = BC = 29$ and $AC = 42$. What is the area of $\triangle ABC$? A. 100 B. 420 C. 500 D. 609 E. 701
7. Each of two boxes contains three chips numbered 1, 2, 3. A chip is drawn randomly from each box and the numbers on the two chips are multiplied. What is the probability that their product is even? A. $\frac{1}{9}$ B. $\frac{2}{9}$ C. $\frac{4}{9}$ D. $\frac{1}{2}$ E. $\frac{5}{9}$	8. What is the smallest whole number larger than the perimeter of any triangle with a side of length 5 and a side of length 19? A. 24 B. 29 C. 43 D. 48 E. 57
9. On her first day of work, Janabel sold one widget. On day two, she sold three widgets. On day three, she sold five widgets, and on each succeeding day, she sold two more widgets than on the previous day. How many widgets in total had Janabel sold after working 20 days? A. 39 B. 40 C. 210 D. 400 E. 401	10. How many integers between 1000 and 9999 have four distinct digits? A. 3024 B. 4536 C. 5040 D. 6480 E. 6561

11. In Mathland, all license plates have four symbols. The first must be a vowel (A, E, I, O, or U), the second and third must be two different letters among the 21 non-vowels, and the fourth must be a digit (0–9). If the symbols are chosen at random subject to these conditions, what is the probability that the plate will read “AMC8”?

- A. $\frac{1}{22,050}$
- B. $\frac{1}{21,000}$
- C. $\frac{1}{10,500}$
- D. $\frac{1}{2,100}$
- E. $\frac{1}{1,050}$

12. How many pairs of parallel edges, such as AB and GH or EH and FG, does a cube have?

- A. 6
- B. 12
- C. 18
- D. 24
- E. 36



13. How many subsets of two elements can be removed from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$ so that the mean (average) of the remaining numbers is 6?

- A. 1
- B. 2
- C. 3
- D. 5
- E. 6

14. Which of the following integers cannot be written as the sum of four consecutive odd integers?

- A. 16
- B. 40
- C. 72
- D. 100
- E. 200

15. At Euler Middle School, 198 students voted on two issues with these results: 149 in favor of the first issue and 119 in favor of the second issue. If exactly 29 students voted against both issues, how many students voted in favor of both issues?

- A. 49
- B. 70
- C. 79
- D. 99
- E. 149

16. In a mentoring program, some sixth graders are paired with ninth graders as buddies. No ninth grader is assigned more than one sixth-grade buddy. If $\frac{1}{3}$ of all ninth graders are paired with $\frac{2}{5}$ of all sixth graders, what fraction of the total number of sixth and ninth graders have a buddy?

- A. $\frac{2}{15}$
- B. $\frac{4}{11}$
- C. $\frac{11}{30}$
- D. $\frac{3}{8}$
- E. $\frac{11}{15}$

17. Jeremy’s father drives him to school in rush hour traffic in 20 minutes. One day there is no traffic, so his father can drive 18 miles per hour faster and get him to school in 12 minutes. How far in miles is it to school?

- A. 4
- B. 6
- C. 8
- D. 9
- E. 12

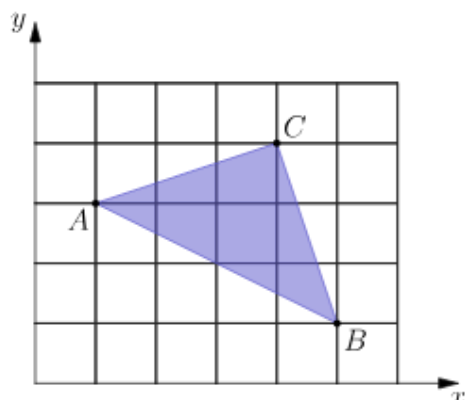
18. Each row and each column in the following 5×5 array is an arithmetic sequence with five terms. What is the value of X?

- A. 21
- B. 31
- C. 36
- D. 40
- E. 42

1				25
		X		
17				81

19. A triangle with vertices $A = (1, 3)$, $B = (5, 1)$, and $C = (4, 4)$ is plotted on a 6×5 grid. What fraction of the grid is covered by the triangle?

- A. $\frac{1}{6}$
- B. $\frac{1}{5}$
- C. $\frac{1}{4}$
- D. $\frac{1}{3}$
- E. $\frac{1}{2}$

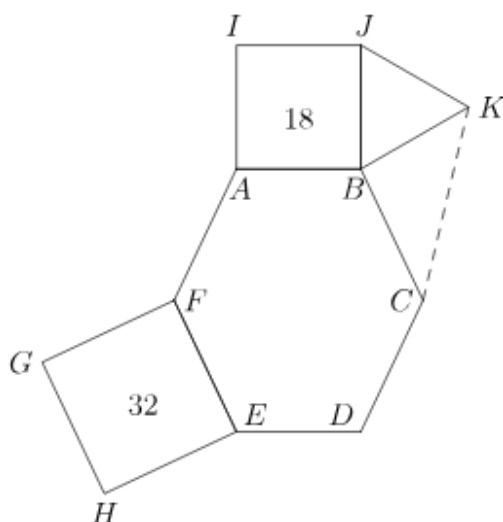


20. Ralph bought 12 pairs of socks for a total of \$24. Some pairs cost \$1, some \$3, and some \$4. If he bought at least one pair of each type, how many pairs of \$1 socks did Ralph buy?

- A. 4
- B. 5
- C. 6
- D. 7
- E. 8

21. In the figure, hexagon $ABCDEF$ is equiangular. $ABJI$ and $FEHG$ are squares with areas 18 and 32 respectively, $\triangle JBK$ is equilateral, and $FE = BC$. What is the area of $\triangle KBC$?

- A. $6\sqrt{2}$
- B. 9
- C. 12
- D. $9\sqrt{2}$
- E. 32



22. On June 1, a group of students is standing in rows, with 15 students in each row. On June 2, the same group is standing with all of the students in one long row. On June 3, the same group is standing with just one student in each row. On June 4, the same group is standing with 6 students in each row. This process continues through June 12 with a different number of students per row each day. However, on June 13, they cannot find a new way of organizing the students. What is the smallest possible number of students in the group?

- A. 21
- B. 30
- C. 60
- D. 90
- E. 1080

23. Tom has twelve slips of paper to put into five cups labeled A, B, C, D, E. He wants the sum of the numbers in each cup to be an integer, and the five integers to be consecutive and increasing from A to E. The slips are: 2, 2, 2, 2.5, 2.5, 3, 3, 3, 3, 3.5, 4, 4.5. If a 2 goes into cup E and a 3 goes into cup B, then the 3.5 must go into what cup?

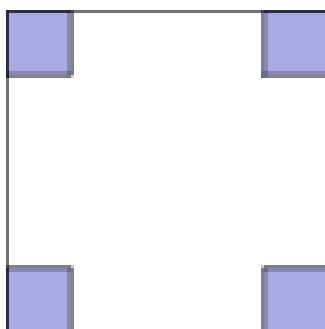
- A. A
- B. B
- C. C
- D. D
- E. E

24. A baseball league consists of two four-team divisions. Each team plays every other team in its division N games. Each team plays every team in the other division M games with $N > 2M$ and $M > 4$. Each team plays a 76-game schedule. How many games does a team play within its own division?

- A. 36
- B. 48
- C. 54
- D. 60
- E. 72

25. One-inch squares are cut from the corners of a 5-inch square. What is the area in square inches of the largest square that can be fitted into the remaining space?

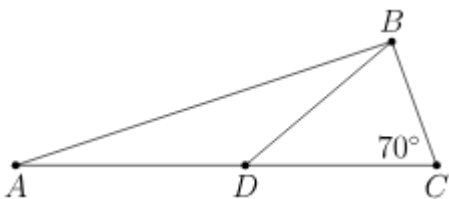
- A. 9
- B. $12\frac{1}{2}$
- C. 15
- D. $15\frac{1}{2}$
- E. 17

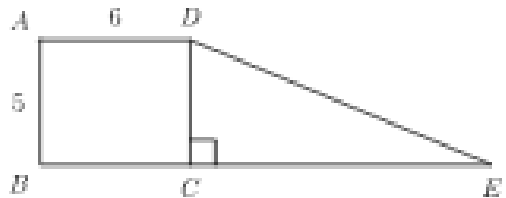
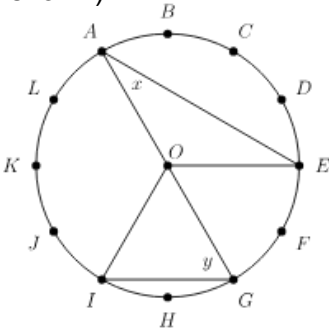
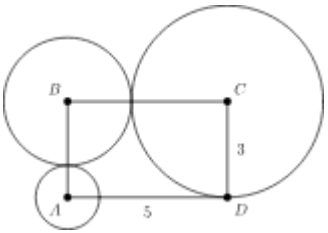


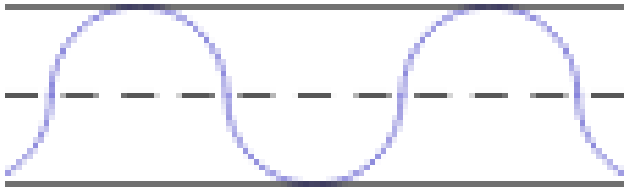
Answer Key:

- 1. A
- 2. D
- 3. D
- 4. E
- 5. A
- 6. B
- 7. E
- 8. D
- 9. D
- 10. B
- 11. B
- 12. C
- 13. D
- 14. D
- 15. D
- 16. B
- 17. D
- 18. B
- 19. A
- 20. D
- 21. C
- 22. C
- 23. D
- 24. B
- 25. C

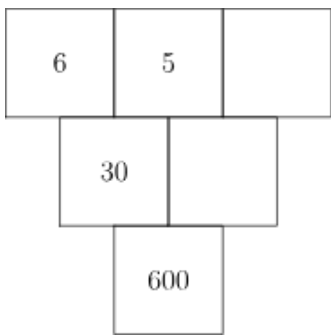
AMC 2014

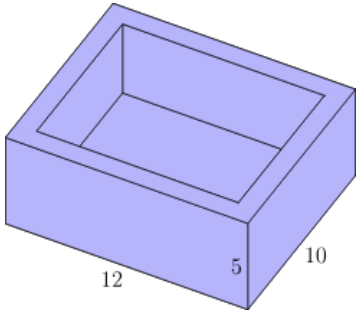
1. What is $H - T$ if Harry correctly computes $8 - (2 + 5)$ and Terry ignores parentheses and computes $8 - 2 + 5$? A. -10 B. -6 C. 0 D. 6 E. 10	2. Paul owes Paula 35 cents and has 5-cent, 10-cent, and 25-cent coins. What is the difference between the largest and smallest number of coins he can use to pay her? A. 1 B. 2 C. 3 D. 4 E. 5
3. Isabella read 36 pages/day for 3 days, then 44 pages/day for 3 days, then 10 pages on the last day. How many pages were in the book? A. 240 B. 250 C. 260 D. 270 E. 280	4. The sum of two primes is 85. What is their product? A. 85 B. 91 C. 115 D. 133 E. 166
5. Margie's car goes 32 miles per gallon; gas costs \$4/gal. How many miles can she drive on \$20 of gas? A. 64 B. 128 C. 160 D. 320 E. 640	6. Six rectangles share base 2 and have lengths 1, 4, 9, 16, 25, 36. What is the sum of their areas? A. 91 B. 93 C. 162 D. 182 E. 202
7. There are four more girls than boys in a 28-student class. What is the ratio of girls to boys? A. 3:4 B. 4:3 C. 3:2 D. 7:4 E. 2:1	8. Eleven students equally paid a speaker a total of \$1A2 (a three-digit amount). What digit is A? A. 0 B. 1 C. 2 D. 3 E. 4
9. In triangle ABC, point D is on AC with $BD = DC$ and $\angle BCD = 70^\circ$. What is $\angle ADB$? A. 100 B. 120 C. 135 D. 140 E. 150 	10. The first AMC 8 was in 1985 and is annual. Samantha turned 12 the year she took the seventh AMC 8. In what year was she born? A. 1979 B. 1980 C. 1981 D. 1982 E. 1983
11. Jack must bike 3 blocks east and 2 blocks north, avoiding the intersection 1 block east and 1 block north of his start. After each block he goes east or north. In how many ways can he reach Jill's house? A. 4 B. 5 C. 6 D. 8 E. 10	12. Three celebrities and their three baby photos are to be matched. Guessing at random, what is the probability of matching all three correctly? A. $1/9$ B. $1/6$ C. $1/4$ D. $1/3$ E. $1/2$

13. For integers n and m, $n^2 + m^2$ is even. Which is impossible? A. n and m are even B. n and m are odd C. $n + m$ is even D. $n + m$ is odd E. none of these are impossible	14. Rectangle ABCD has area 30; right triangle DCE has the same area and is attached to form a trapezoid. If $CD = 5$ and CE is perpendicular to DC, what is DE? A. 12 B. 13 C. 14 D. 15 E. 16 
15. A circle centered at O is divided into 12 equal arcs labeled A through L. What is $x + y$ in degrees (as shown)? A. 75 B. 80 C. 90 D. 120 E. 150 	16. In the “Middle School Eight” conference with 8 teams, each team plays every other team twice (home & away) and also 4 non-conference games. How many total games are there in the season? A. 60 B. 88 C. 96 D. 144 E. 160
17. George normally walks 1 mile at 3 mph and arrives on time. Today he walked the first $\frac{1}{2}$ mile at 2 mph. At what mph must he run the last $\frac{1}{2}$ mile to arrive on time? A. 4 B. 6 C. 8 D. 10 E. 12	18. Four children were born; each is equally likely boy or girl. Which outcome is most likely? A. all 4 are boys B. all 4 are girls C. 2 girls and 2 boys D. 3 of one gender and 1 of the other E. all outcomes equally likely
19. Build a $3 \times 3 \times 3$ cube (surface area 54) from 27 unit cubes: 21 red, 6 white. If arranged to minimize white showing, what fraction of the surface area is white? A. $\frac{5}{54}$ B. $\frac{1}{9}$ C. $\frac{5}{27}$ D. $\frac{2}{9}$ E. $\frac{1}{3}$	20. Rectangle ABCD has $CD = 3$ and $DA = 5$. Circles of radii 1, 2, 3 are centered at A, B, C respectively; consider only the quarter-circle sectors inside the rectangle. Which is closest to the area inside the rectangle but outside all three circles? A. 3.5 B. 4.0 C. 4.5 D. 5.0 E. 5.5 
21. The 7-digit numbers 74A52B1 and 326AB4C are multiples of 3. Which could be C? A. 1 B. 2 C. 3 D. 5 E. 8	22. A two-digit number equals (product of its digits) + (sum of its digits). What is its units digit? A. 1 B. 3 C. 5 D. 7 E. 9

23. Ashley, Brittany, and Caitlin have two-digit prime uniform numbers. The sum of the other two's numbers equals each girl's (distinct) birthday date this month, and today's date equals the sum of the other two for Ashley. What number does Caitlin wear? A. 11 B. 13 C. 17 D. 19 E. 23	24. A shop sold 252 soda cans to 100 customers; each bought at least one. What is the maximum possible median number of cans bought? A. 2.5 B. 3.0 C. 3.5 D. 4.0 E. 4.5
25. A one-mile, 40-ft-wide highway is closed. Robert rides along a path of semicircles spanning the width back-to-back over the mile. If he rides 5 mph, how many hours does the one-mile stretch take? A. $\pi/11$ B. $\pi/10$ C. $\pi/5$ D. $2\pi/5$ E. $2\pi/3$ 	Answer Key: 1. A 2. E 3. B 4. E 5. C 6. D 7. B 8. D 9. D 10. A 11. A 12. B 13. D 14. B 15. C 16. B 17. B 18. D 19. A 20. B 21. A 22. E 23. A 24. C 25. B

AMC 2013

1. Danica wants to arrange her model cars in rows with exactly 6 cars in each row. She now has 23 model cars. What is the smallest number of additional cars she must buy in order to be able to arrange all her cars this way? A. 1 B. 2 C. 3 D. 4 E. 5	2. A sign at the fish market says, "50% off, today only: half-pound packages for just \$3 per package." What is the regular price for a full pound of fish, in dollars? A. 6 B. 9 C. 10 D. 12 E. 15
3. What is the value of $4 \cdot (-1 + 2 - 3 + 4 - 5 + 6 - 7 + \dots + 1000)$? A. -10 B. 0 C. 1 D. 500 E. 2000	4. Eight friends ate at a restaurant and agreed to share the bill equally. Because Judi forgot her money, each of her seven friends paid an extra \$2.50 to cover her portion of the total bill. What was the total bill? A. \$120 B. \$128 C. \$140 D. \$144 E. \$160
5. Hammie is in the 6th grade and weighs 106 pounds. His quadruplet sisters are tiny babies and weigh 5, 5, 6, and 8 pounds. Which is greater, the average (mean) weight of these five children or the median weight, and by how many pounds? A. median, by 60 B. median, by 20 C. average, by 5 D. average, by 15 E. average, by 20	6. The number in each box below is the product of the numbers in the two boxes that touch it in the row above. For example, $30 = 6 \times 5$. What is the missing number in the top row?  A. 2 B. 3 C. 4 D. 5 E. 6
7. Trey and his mom stopped at a railroad crossing to let a train pass. As the train began to pass, Trey counted 6 cars in the first 10 seconds. It took the train 2 minutes and 45 seconds to clear the crossing at a constant speed. Which of the following was the most likely number of cars in the train? A. 60 B. 80 C. 100 D. 120 E. 140	8. A fair coin is tossed 3 times. What is the probability of at least two consecutive heads? A. $1/8$ B. $1/4$ C. $3/8$ D. $1/2$ E. $3/4$
9. The Incredible Hulk can double the distance he jumps with each succeeding jump. If his first jump is 1 meter, the second jump is 2 meters, the third jump is 4 meters, and so on, then on which jump will he first be able to jump more than 1 kilometer (1,000 meters)? A. 9th B. 10th C. 11th D. 12th E. 13th	10. What is the ratio of the least common multiple of 180 and 594 to the greatest common factor of 180 and 594? A. 110 B. 165 C. 330 D. 625 E. 660

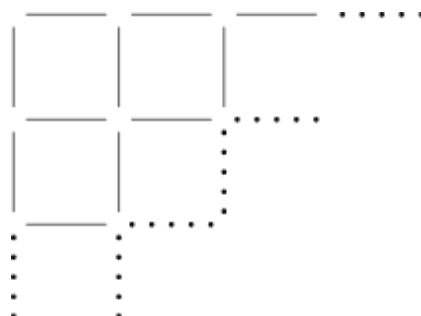
11. Ted's grandfather used his treadmill on 3 days this week. He went 2 miles each day. On Monday he jogged at a speed of 5 miles per hour. He walked at the rate of 3 miles per hour on Wednesday and at 4 miles per hour on Friday. If Grandfather had always walked at 4 miles per hour, he would have spent less time on the treadmill. How many minutes less? A. 1 B. 2 C. 3 D. 4 E. 5	12. At the 2013 Winnebago County Fair a vendor is offering a "fair special" on sandals. If you buy one pair of sandals at the regular price of \$50, you get a second pair at a 40% discount, and a third pair at half the regular price. Javier took advantage of the "fair special" to buy three pairs of sandals. What percentage of the \$150 regular price did he save? A. 25 B. 30 C. 33 D. 40 E. 45
13. When Clara totaled her scores, she inadvertently reversed the units digit and the tens digit of one score. By which of the following might her incorrect sum have differed from the correct one? A. 45 B. 46 C. 47 D. 48 E. 49	14. Abe holds 1 green and 1 red jelly bean in his hand. Bob holds 1 green, 1 yellow, and 2 red jelly beans in his hand. Each randomly picks a jelly bean to show the other. What is the probability that the colors match? A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{3}{8}$ D. $\frac{1}{2}$ E. $\frac{2}{3}$
15. If we have $\{ 3^p + 3^4 = 90 ; 2^r + 4^4 = 76 ; 5^3 + 6^s = 1421 \}$, what is the product of p, r, and s? A. 27 B. 40 C. 50 D. 70 E. 90	16. A number of students from Fibonacci Middle School are taking part in a community service project. The ratio of 8th-graders to 6th-graders is 5:3, and the ratio of 8th-graders to 7th-graders is 8:5. What is the smallest number of students that could be participating in the project? A. 16 B. 40 C. 55 D. 79 E. 89
17. The sum of six consecutive positive integers is 2013. What is the largest of these six integers? A. 335 B. 338 C. 340 D. 345 E. 350	18. Isabella uses one-foot cubical blocks to build a rectangular fort that is 12 feet long, 10 feet wide, and 5 feet high. The floor and the four walls are all one foot thick. How many blocks does the fort contain? A. 204 B. 280 C. 320 D. 340 E. 600 
19. Bridget, Cassie, and Hannah are discussing the results of their last math test. Hannah shows Bridget and Cassie her test, but Bridget and Cassie don't show theirs to anyone. Cassie says, "I didn't get the lowest score in our class," and Bridget adds, "I didn't get the highest score." What is the ranking of the three girls from highest to lowest? A. Hannah, Cassie, Bridget B. Hannah, Bridget, Cassie C. Cassie, Bridget, Hannah D. Cassie, Hannah, Bridget E. Bridget, Cassie, Hannah	20. A 1×2 rectangle is inscribed in a semicircle with the longer side on the diameter. What is the area of the semicircle? A. $\frac{\pi}{2}$ B. $\frac{2\pi}{3}$ C. π D. $\frac{4\pi}{3}$ E. $\frac{5\pi}{3}$

21. Samantha lives 2 blocks west and 1 block south of the southwest corner of City Park. Her school is 2 blocks east and 2 blocks north of the northeast corner of City Park. On school days she bikes on streets to the southwest corner of City Park, then takes a diagonal path through the park to the northeast corner, and then bikes on streets to school. If her route is as short as possible, how many different routes can she take?

- A. 3
- B. 6
- C. 9
- D. 12
- E. 18

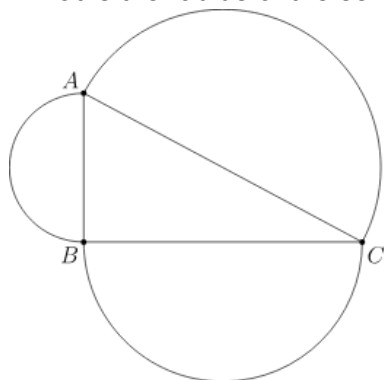
22. Toothpicks are used to make a grid that is 60 toothpicks long and 32 toothpicks wide. How many toothpicks are used altogether?

- A. 1920
- B. 1952
- C. 1980
- D. 2013
- E. 3932



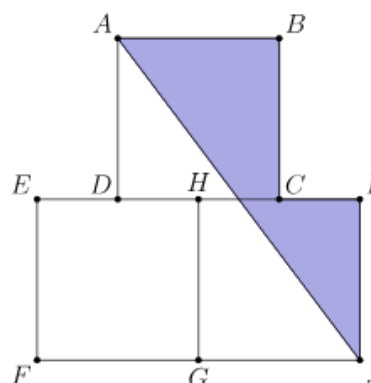
23. Angle ABC of $\triangle ABC$ is a right angle. The sides of $\triangle ABC$ are the diameters of semicircles as shown. The area of the semicircle on AB equals 8π , and the arc of the semicircle on AC has length 8.5π . What is the radius of the semicircle on BC?

- A. 7
- B. 7.5
- C. 8
- D. 8.5
- E. 9



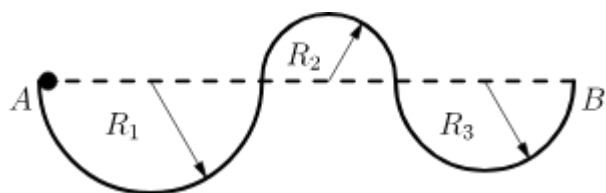
24. Squares ABCD, EFGH, and GHIJ are equal in area. Points C and D are the midpoints of sides IH and HE, respectively. What is the ratio of the area of the shaded pentagon AJICB to the sum of the areas of the three squares?

- A. $1/4$
- B. $7/24$
- C. $1/3$
- D. $3/8$
- E. $5/12$



25. A ball with diameter 4 inches starts at point A to roll along the track shown. The track is comprised of 3 semicircular arcs whose radii are $R_1 = 100$ inches, $R_2 = 60$ inches, and $R_3 = 80$ inches, respectively. The ball always remains in contact with the track and does not slip. What is the distance the center of the ball travels over the course from A to B?

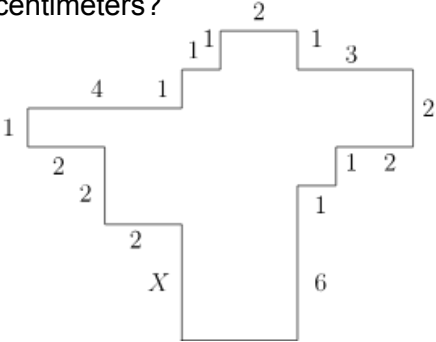
- A. 238π
- B. 240π
- C. 260π
- D. 280π
- E. 500π



Answer Key:

- 1. A
- 2. D
- 3. E
- 4. C
- 5. E
- 6. C
- 7. C
- 8. C
- 9. C
- 10. C
- 11. D
- 12. B
- 13. A
- 14. C
- 15. B
- 16. E
- 17. B
- 18. B
- 19. D
- 20. C
- 21. E
- 22. E
- 23. B
- 24. C
- 25. A

AMC 2012

1. Rachelle uses 3 pounds of meat to make 8 hamburgers for her family. How many pounds of meat does she need to make 24 hamburgers for a neighborhood picnic? A. 6 B. $6\frac{2}{3}$ C. $7\frac{1}{2}$ D. 8 E. 9	2. In the country of East Westmore, statisticians estimate there is a baby born every 8 hours and a death every day. To the nearest hundred, how many people are added to the population of East Westmore each year? A. 600 B. 700 C. 800 D. 900 E. 1000
3. On February 13 The Oshkosh Northwestern listed the length of daylight as 10 hours and 24 minutes, the sunrise was 6:57 AM, and the sunset as 8:15 PM. The length of daylight and sunrise were correct, but the sunset was wrong. When did the sun really set? A. 5:10 PM B. 5:21 PM C. 5:41 PM D. 5:57 PM E. 6:03 PM	4. Peter's family ordered a 12-slice pizza for dinner. Peter ate one slice and shared another slice equally with his brother Paul. What fraction of the pizza did Peter eat? A. $\frac{1}{24}$ B. $\frac{1}{12}$ C. $\frac{1}{8}$ D. $\frac{1}{6}$ E. $\frac{1}{4}$
5. In the diagram, all angles are right angles and the lengths of the sides are given in centimeters. Note the diagram is not drawn to scale. What is X, in centimeters? A. 1 B. 2 C. 3 D. 4 E. 5 	6. A rectangular photograph is placed in a frame that forms a border two inches wide on all sides of the photograph. The photograph measures 8 inches high and 10 inches wide. What is the area of the border, in square inches? A. 36 B. 40 C. 64 D. 72 E. 88
7. Isabella must take four 100-point tests in her math class. Her goal is to achieve an average grade of 95 on the tests. Her first two test scores were 97 and 91. After seeing her score on the third test, she realized she can still reach her goal. What is the lowest possible score she could have made on the third test? A. 90 B. 92 C. 95 D. 96 E. 97	8. A shop advertises everything is "half price in today's sale." In addition, a coupon gives a 20% discount on sale prices. Using the coupon, the price today represents what percentage off the original price? A. 10 B. 33 C. 40 D. 60 E. 70
9. The Fort Worth Zoo has a number of two-legged birds and a number of four-legged mammals. On one visit to the zoo, Margie counted 200 heads and 522 legs. How many of the animals that Margie counted were two-legged birds? A. 61 B. 122 C. 139 D. 150 E. 161	10. How many 4-digit numbers greater than 1000 are there that use the four digits of 2012? A. 6 B. 7 C. 8 D. 9 E. 12

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

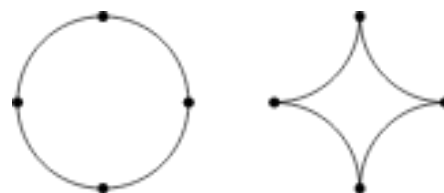
11. The mean, median, and unique mode of the positive integers 3, 4, 5, 6, 6, 7, and x are all equal. What is the value of x? A. 5 B. 6 C. 7 D. 11 E. 12	12. What is the units digit of 13^{2012}? A. 1 B. 3 C. 5 D. 7 E. 9
13. Jamar bought some pencils costing more than a penny each at the school bookstore and paid \$1.43. Sharona bought some of the same pencils and paid \$1.87. How many more pencils did Sharona buy than Jamar? A. 2 B. 3 C. 4 D. 5 E. 6	14. In the BIG N, a middle school football conference, each team plays every other team exactly once. If a total of 21 conference games were played during the 2012 season, how many teams were members of the BIG N conference? A. 6 B. 7 C. 8 D. 9 E. 10
15. The smallest number greater than 2 that leaves a remainder of 2 when divided by 3, 4, 5, or 6 lies between what numbers? A. 40 and 50 B. 51 and 55 C. 56 and 60 D. 61 and 65 E. 66 and 99	16. Each of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 is used only once to make two five-digit numbers so that they have the largest possible sum. Which of the following could be one of the numbers? A. 76531 B. 86724 C. 87431 D. 96240 E. 97403
17. A square with integer side length is cut into 10 squares, all of which have integer side length and at least 8 of which have area 1. What is the smallest possible value of the length of the side of the original square? A. 3 B. 4 C. 5 D. 6 E. 7	18. What is the smallest positive integer that is neither prime nor square and that has no prime factor less than 50? A. 3127 B. 3133 C. 3137 D. 3139 E. 3149
19. In a jar of red, green, and blue marbles, all but 6 are red marbles, all but 8 are green, and all but 4 are blue. How many marbles are in the jar? A. 6 B. 8 C. 9 D. 10 E. 12	20. What is the correct ordering of the three numbers $\frac{5}{19}$, $\frac{7}{21}$, and $\frac{9}{23}$, in increasing order? A. $\frac{9}{23} < \frac{7}{21} < \frac{5}{19}$ B. $\frac{5}{19} < \frac{7}{21} < \frac{9}{23}$ C. $\frac{9}{23} < \frac{5}{19} < \frac{7}{21}$ D. $\frac{5}{19} < \frac{9}{23} < \frac{7}{21}$ E. $\frac{7}{21} < \frac{5}{19} < \frac{9}{23}$
21. Marla has a large white cube that has an edge of 10 feet. She also has enough green paint to cover 300 square feet. Marla uses all the paint to create a white square centered on each face, surrounded by a green border. What is the area of one of the white squares, in square feet? A. $5\sqrt{2}$ B. 10 C. $10\sqrt{2}$ D. 50 E. $50\sqrt{2}$	22. Let R be a set of nine distinct integers. Six of the elements are 2, 3, 4, 6, 9, and 14. What is the number of possible values of the median of R? A. 4 B. 5 C. 6 D. 7 E. 8

23. An equilateral triangle and a regular hexagon have equal perimeters. If the area of the triangle is 4, what is the area of the hexagon?

- A. 4
- B. 5
- C. 6
- D. $4\sqrt{3}$
- E. $6\sqrt{3}$

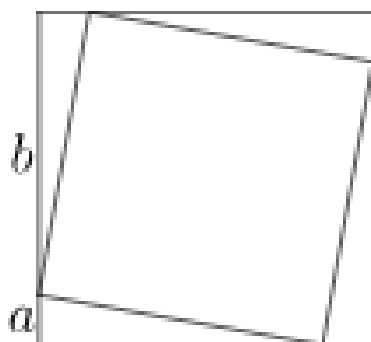
24. A circle of radius 2 is cut into four congruent arcs. The four arcs are joined to form the star figure shown. What is the ratio of the area of the star figure to the area of the original circle?

- A. $(4 - \pi)/\pi$
- B. $1/\pi$
- C. $\sqrt{2}/\pi$
- D. $(\pi - 1)/\pi$
- E. $3/\pi$



25. A square with area 4 is inscribed in a square with area 5, with one vertex of the smaller square on each side of the larger square. A vertex of the smaller square divides a side of the larger square into two segments, one of length a , and the other of length b . What is the value of ab ?

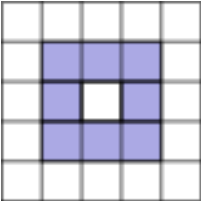
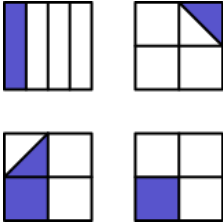
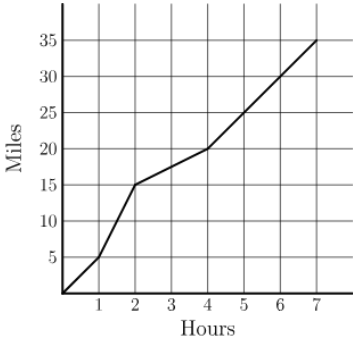
- A. $1/5$
- B. $2/5$
- C. $1/2$
- D. 1
- E. 4



Answer Key:

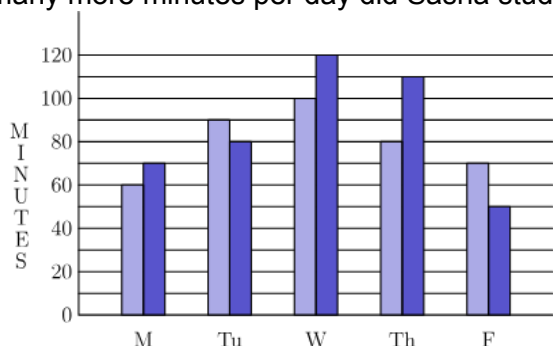
- 1. E
- 2. B
- 3. B
- 4. C
- 5. E
- 6. E
- 7. B
- 8. D
- 9. C
- 10. D
- 11. D
- 12. A
- 13. C
- 14. B
- 15. D
- 16. C
- 17. B
- 18. A
- 19. C
- 20. B
- 21. D
- 22. D
- 23. C
- 24. A
- 25. C

AMC 2011

1. Margie bought 3 apples at a cost of 50 cents per apple. She paid with a 5-dollar bill. How much change did Margie receive? A. \$1.50 B. \$2.00 C. \$2.50 D. \$3.00 E. \$3.50	2. Karl's rectangular vegetable garden is 20 feet by 45 feet, and Makenna's is 25 feet by 40 feet. Whose garden is larger in area? A. Karl's garden is larger by 100 square feet. B. Karl's garden is larger by 25 square feet. C. The gardens are the same size. D. Makenna's garden is larger by 25 square feet. E. Makenna's garden is larger by 100 square feet.
3. Extend the square pattern of 8 colored and 17 uncolored square tiles by attaching a border of colored tiles around the square. What is the ratio of colored tiles to uncolored tiles in the extended pattern? A. 8:17 B. 25:49 C. 36:25 D. 32:17 E. 36:17 	4. Here is a list of the numbers of fish that Tyler caught in nine outings last summer: 2, 0, 1, 3, 0, 3, 3, 1, 2. Which statement about the mean, median, and mode is true? A. median < mean < mode B. mean < mode < median C. mean < median < mode D. median < mode < mean E. mode < median < mean
5. What time was it 2011 minutes after midnight on January 1, 2011? A. January 1 at 9:31 PM B. January 1 at 11:51 PM C. January 2 at 3:11 AM D. January 2 at 9:31 AM E. January 2 at 6:01 PM	6. In a town of 351 adults, every adult owns a car, motorcycle, or both. If 331 adults own cars and 45 adults own motorcycles, how many of the car owners do not own a motorcycle? A. 20 B. 25 C. 45 D. 306 E. 351
7. Each of the following four large congruent squares is subdivided into combinations of congruent triangles or rectangles and is partially shaded. What percent of the total area is partially shaded? A. 12.5 B. 20 C. 25 D. 33 $\frac{1}{3}$ E. 37.5 	8. Bag A has three chips labeled 1, 3, and 5. Bag B has three chips labeled 2, 4, and 6. If one chip is drawn from each bag, how many different values are possible for the sum of the two numbers on the chips? A. 4 B. 5 C. 6 D. 7 E. 9
9. Carmen takes a long bike ride on a hilly highway. The graph indicates the miles traveled during the time of her ride. What is Carmen's average speed for her entire ride in miles per hour? A. 2 B. 2.5 C. 4 D. 4.5 E. 5 	10. The taxi fare in Gotham City is \$2.40 for the first $\frac{1}{2}$ mile and additional mileage charged at the rate \$0.20 for each additional 0.1 mile. You plan to give the driver a \$2 tip. How many miles can you ride for \$10? A. 3.0 B. 3.25 C. 3.3 D. 3.5 E. 3.75

11. The graph shows the number of minutes studied by both Asha (black bar) and Sasha (grey bar) in one week. On the average, how many more minutes per day did Sasha study than Asha?

- A. 6
- B. 8
- C. 9
- D. 10
- E. 12

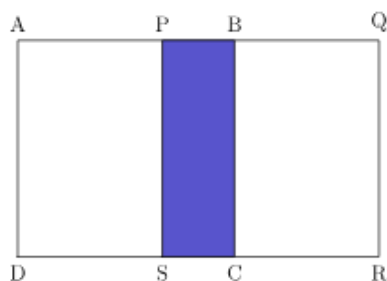


12. Angie, Bridget, Carlos, and Diego are seated at random around a square table, one person to a side. What is the probability that Angie and Carlos are seated opposite each other?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{2}{3}$
- E. $\frac{3}{4}$

13. Two congruent squares, ABCD and PQRS, have side length 15. They overlap to form the 15 by 25 rectangle AQRD shown. What percent of the area of rectangle AQRD is shaded?

- A. 15
- B. 18
- C. 20
- D. 24
- E. 25



14. There are 270 students at Colfax Middle School, where the ratio of boys to girls is 5:4. There are 180 students at Winthrop Middle School, where the ratio of boys to girls is 4:5. The two schools hold a dance and all students from both schools attend. What fraction of the students at the dance are girls?

- A. $\frac{7}{18}$
- B. $\frac{7}{15}$
- C. $\frac{22}{45}$
- D. $\frac{1}{2}$
- E. $\frac{23}{45}$

15. How many digits are in the product $4^5 \cdot 5^{10}$?

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12

16. Let A be the area of the triangle with sides of length 25, 25, and 30. Let B be the area of the triangle with sides of length 25, 25, and 40. What is the relationship between A and B?

- A. $A = \frac{9}{16}B$
- B. $A = \frac{3}{4}B$
- C. $A = B$
- D. $A = \frac{4}{3}B$
- E. $A = \frac{16}{9}B$

17. Let w, x, y, and z be whole numbers. If $2^w \cdot 3^x \cdot 5^y \cdot 7^z = 588$, then what does $2w + 3x + 5y + 7z$ equal?

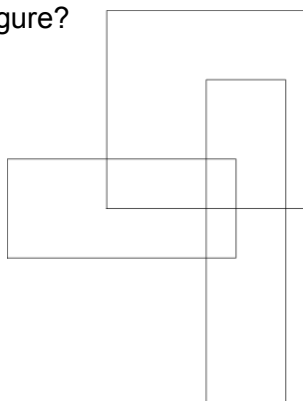
- A. 21
- B. 25
- C. 27
- D. 35
- E. 56

18. A fair 6-sided die is rolled twice. What is the probability that the first number that comes up is greater than or equal to the second number?

- A. $\frac{1}{6}$
- B. $\frac{5}{12}$
- C. $\frac{1}{2}$
- D. $\frac{7}{12}$
- E. $\frac{5}{6}$

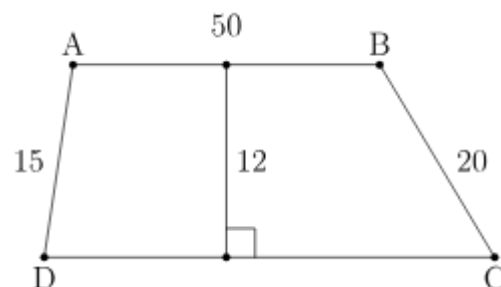
19. How many rectangles are in this figure?

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12



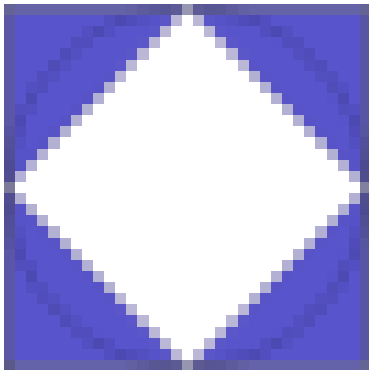
20. Quadrilateral ABCD is a trapezoid, $AD = 15$, $AB = 50$, $BC = 20$, and the altitude is 12. What is the area of the trapezoid?

- A. 600
- B. 650
- C. 700
- D. 750
- E. 800

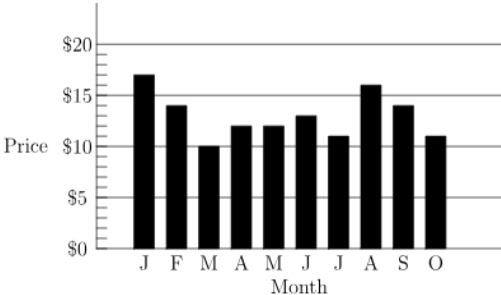


AI HOMEWORK

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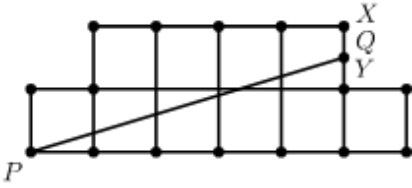
21. Students guess that Norb's age is 24, 28, 30, 32, 36, 38, 41, 44, 47, and 49. Norb says, "At least half of you guessed too low, two of you are off by one, and my age is a prime number." How old is Norb? A. 29 B. 31 C. 37 D. 43 E. 48	22. What is the tens digit of 7^{2011}? A. 0 B. 1 C. 3 D. 4 E. 7
23. How many 4-digit positive integers have four different digits, where the leading digit is not zero, the integer is a multiple of 5, and 5 is the largest digit? A. 24 B. 48 C. 60 D. 84 E. 108	24. In how many ways can 10001 be written as the sum of two primes? A. 0 B. 1 C. 2 D. 3 E. 4
25. A circle with radius 1 is inscribed in a square and circumscribed about another square as shown. Which fraction is closest to the ratio of the circle's shaded area to the area between the two squares? A. $\frac{1}{2}$ B. 1 C. $\frac{3}{2}$ D. 2 E. $\frac{5}{2}$ 	Answer Key: 1. E 2. E 3. D 4. C 5. D 6. D 7. C 8. B 9. E 10. C 11. A 12. B 13. C 14. C 15. D 16. C 17. A 18. D 19. D 20. D 21. C 22. D 23. D 24. A 25. A

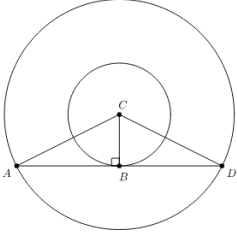
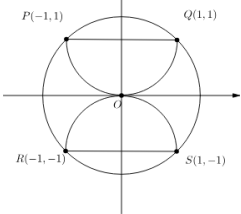
AMC 2010

1. At Euclid Middle School the mathematics teachers are Mrs. Germain, Mr. Newton, and Mrs. Young. There are 11 students in Mrs. Germain's class, 8 students in Mr. Newton's class, and 9 students in Mrs. Young's class taking the AMC 8 this year. How many mathematics students at Euclid Middle School are taking the contest? A. 26 B. 27 C. 28 D. 29 E. 30	2. If $a * b = (a \times b) / (a + b)$ for a, b positive integers, then what is $5 * 10$? A. $3/10$ B. 1 C. 2 D. $10/3$ E. 50																						
3. The graph shows the price of five gallons of gasoline during the first ten months of the year. By what percent is the highest price more than the lowest price? A. 50 B. 62 C. 70 D. 89 E. 100  <table border="1"> <caption>Gasoline Prices by Month</caption> <thead> <tr> <th>Month</th> <th>Price (\$)</th> </tr> </thead> <tbody> <tr><td>J</td><td>17</td></tr> <tr><td>F</td><td>14</td></tr> <tr><td>M</td><td>10</td></tr> <tr><td>A</td><td>12</td></tr> <tr><td>M</td><td>12</td></tr> <tr><td>J</td><td>13</td></tr> <tr><td>J</td><td>11</td></tr> <tr><td>A</td><td>16</td></tr> <tr><td>S</td><td>14</td></tr> <tr><td>O</td><td>11</td></tr> </tbody> </table>	Month	Price (\$)	J	17	F	14	M	10	A	12	M	12	J	13	J	11	A	16	S	14	O	11	4. What is the sum of the mean, median, and mode of the numbers 2, 3, 0, 3, 1, 4, 0, 3? A. 6.5 B. 7 C. 7.5 D. 8.5 E. 9
Month	Price (\$)																						
J	17																						
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S	14																						
O	11																						
5. Alice needs to replace a light bulb located 10 centimeters below the ceiling in her kitchen. The ceiling is 2.4 meters above the floor. Alice is 1.5 meters tall and can reach 46 centimeters above the top of her head. Standing on a stool, she can just reach the light bulb. What is the height of the stool, in centimeters? A. 32 B. 34 C. 36 D. 38 E. 40	6. Which of the following figures has the greatest number of lines of symmetry? A. equilateral triangle B. non-square rhombus C. non-square rectangle D. isosceles trapezoid E. square																						
7. Using only pennies, nickels, dimes, and quarters, what is the smallest number of coins Freddie would need so he could pay any amount of money less than a dollar? A. 6 B. 10 C. 15 D. 25 E. 99	8. As Emily is riding her bicycle on a long straight road, she spots Emerson skating in the same direction $1/2$ mile in front of her. After she passes him, she can see him in her rear mirror until he is $1/2$ mile behind her. Emily rides at a constant rate of 12 miles per hour, and Emerson skates at a constant rate of 8 miles per hour. For how many minutes can Emily see Emerson? A. 6 B. 8 C. 12 D. 15 E. 16																						

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

9. Ryan got 80% of the problems correct on a 25-problem test, 90% on a 40-problem test, and 70% on a 10-problem test. What percent of all the problems did Ryan answer correctly? A. 64 B. 75 C. 80 D. 84 E. 86	10. Six pepperoni circles will exactly fit across the diameter of a 12-inch pizza when placed. If a total of 24 circles of pepperoni are placed on this pizza without overlap, what fraction of the pizza is covered by pepperoni? A. $\frac{1}{2}$ B. $\frac{2}{3}$ C. $\frac{3}{4}$ D. $\frac{5}{6}$ E. $\frac{7}{8}$
11. The top of one tree is 16 feet higher than the top of another tree. The heights of the two trees are in the ratio 3:4. In feet, how tall is the taller tree? A. 48 B. 64 C. 80 D. 96 E. 112	12. Of the 500 balls in a large bag, 80% are red and the rest are blue. How many of the red balls must be removed so that 75% of the remaining balls are red? A. 25 B. 50 C. 75 D. 100 E. 150
13. The lengths of the sides of a triangle in inches are three consecutive integers. The length of the shortest side is 30% of the perimeter. What is the length of the longest side? A. 7 B. 8 C. 9 D. 10 E. 11	14. What is the sum of the prime factors of 2010? A. 67 B. 75 C. 77 D. 201 E. 210
15. A jar contains 5 different colors of gumdrops. Thirty percent are blue, 20% are brown, 15% are red, 10% are yellow, and the other 30 gumdrops are green. If half of the blue gumdrops are replaced with brown gumdrops, how many gumdrops will be brown? A. 35 B. 36 C. 42 D. 48 E. 64	16. A square and a circle have the same area. What is the ratio of the side length of the square to the radius of the circle? A. $\frac{\pi}{2}$ B. $\sqrt{\pi}$ C. π D. 2π E. $\frac{\pi}{2}$
17. The diagram shows an octagon consisting of 10 unit squares. The portion below PQ is a unit square and a triangle with base 5. If PQ bisects the area of the octagon, what is the ratio XQ/QY?  A. $\frac{2}{5}$ B. $\frac{1}{2}$ C. $\frac{3}{5}$ D. $\frac{2}{3}$ E. $\frac{3}{4}$	18. A decorative window is made up of a rectangle with semicircles at either end. The ratio of AD to AB is 3:2, and AB is 30 inches. What is the ratio of the area of the rectangle to the combined area of the semicircles?  A. 2:3 B. 3:2 C. $6:\pi$ D. $9:\pi$ E. $30:\pi$

19. The two circles pictured have the same center C. Chord AD is tangent to the inner circle at B, AC is 10, and chord AD has length 16. What is the area between the two circles? A. 36π B. 49π C. 64π D. 81π E. 100π 	20. In a room, $\frac{2}{5}$ of the people are wearing gloves, and $\frac{3}{4}$ of the people are wearing hats. What is the minimum number of people in the room wearing both a hat and a glove? A. 3 B. 5 C. 8 D. 15 E. 20
21. Hui is an avid reader. She bought a copy of the best seller Math is Beautiful. On the first day, Hui read $\frac{1}{5}$ of the pages plus 12 more, and on the second day she read $\frac{1}{4}$ of the remaining pages plus 15 pages. On the third day she read $\frac{1}{3}$ of the remaining pages plus 18 pages. She then realized that there were only 62 pages left to read, which she read the next day. How many pages are in this book? A. 120 B. 180 C. 240 D. 300 E. 360	22. The hundreds digit of a three-digit number is 2 more than the units digit. The digits of the three-digit number are reversed, and the result is subtracted from the original three-digit number. What is the units digit of the result? A. 0 B. 2 C. 4 D. 6 E. 8
23. Semicircles POQ and ROS pass through the center O. What is the ratio of the combined areas of the two semicircles to the area of circle O? A. $\frac{2}{4}$ B. $\frac{1}{2}$ C. $\frac{2}{\pi}$ D. $\frac{2}{3}$ E. $\frac{2}{2}$ 	24. What is the correct ordering of the three numbers, 10^8, 5^{12}, and 2^{24}? A. $2^{24} < 10^8 < 5^{12}$ B. $2^{24} < 5^{12} < 10^8$ C. $5^{12} < 2^{24} < 10^8$ D. $10^8 < 5^{12} < 2^{24}$ E. $10^8 < 2^{24} < 5^{12}$
25. Everyday at school, Jo climbs a flight of 6 stairs. Jo can take the stairs 1, 2, or 3 at a time. For example, Jo could climb 3, then 1, then 2. In how many ways can Jo climb the stairs? A. 13 B. 18 C. 20 D. 22 E. 24	Answer Key: C D C C B E B D D B B D E C C C B D C C A C E B A E

AMC 2009

1. Bridget bought a bag of apples at the grocery store. She gave half of the apples to Ann. Then she gave Cassie 3 apples, keeping 4 apples for herself. How many apples did Bridget buy?

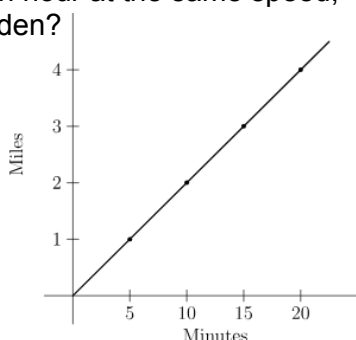
- A. 3
- B. 4
- C. 7
- D. 11
- E. 14

2. On average, for every 4 sports cars sold at the local dealership, 7 sedans are sold. The dealership predicts that it will sell 28 sports cars next month. How many sedans does it expect to sell?

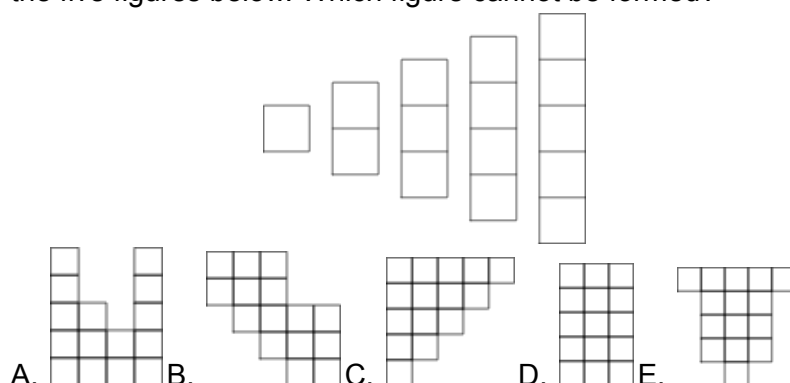
- A. 7
- B. 32
- C. 35
- D. 49
- E. 112

3. The graph shows the constant rate at which Suzanna rides her bike. If she rides a total of half an hour at the same speed, how many miles would she have ridden?

- A. 5
- B. 5.5
- C. 6
- D. 6.5
- E. 7



4. The five pieces shown below can be arranged to form four of the five figures below. Which figure cannot be formed?



5. A sequence starts 1, 2, 3. The fourth number is the sum of the previous three: $1+2+3=6$. Each following term equals the sum of the previous three. What is the eighth number?

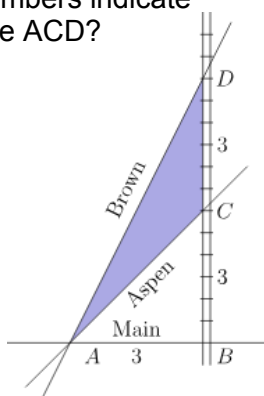
- A. 11
- B. 20
- C. 37
- D. 68
- E. 99

6. Steve's empty swimming pool holds 24,000 gallons when full. It will be filled by 4 hoses, each supplying 2.5 gallons per minute. How many hours will it take to fill the pool?

- A. 40
- B. 42
- C. 44
- D. 46
- E. 48

7. The triangular plot of ACD lies between Aspen Road, Brown Road, and a railroad (rail width ignored). Numbers indicate miles. How many square miles are in triangle ACD?

- A. 2
- B. 3
- C. 4.5
- D. 6
- E. 9

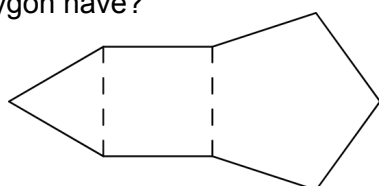


8. The length of a rectangle is increased by 10% and the width is decreased by 10%. What percent of the old area is the new area?

- A. 90
- B. 99
- C. 100
- D. 101
- E. 110

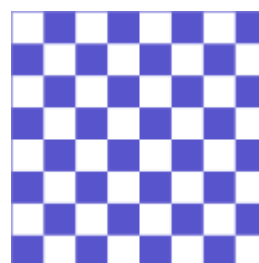
9. Construct a square on one side of an equilateral triangle. On a non-adjacent side of the square, construct a regular pentagon. On a non-adjacent side of the pentagon, construct a hexagon, and continue this pattern until you construct an octagon. How many sides does the resulting polygon have?

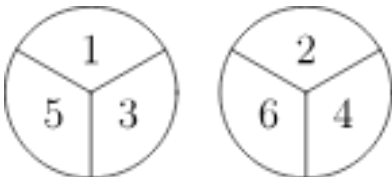
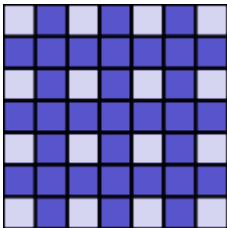
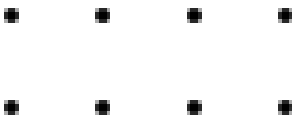
- A. 21
- B. 23
- C. 25
- D. 27
- E. 29



10. On a checkerboard of 64 unit squares, what is the probability a randomly chosen unit square does not touch the outer edge?

- A. $1/16$
- B. $7/16$
- C. $1/2$
- D. $9/16$
- E. $49/64$



11. A school bookstore sells pencils costing a whole number of cents. Some 7th graders each bought a pencil, paying a total of \$1.43. Some of the 30 sixth graders each bought a pencil, paying a total of \$1.95. How many more sixth graders than seventh graders bought a pencil? A. 1 B. 2 C. 3 D. 4 E. 5	12. The two spinners shown are spun once. What is the probability that the sum of the numbers is prime? A. $\frac{1}{2}$ B. $\frac{2}{3}$ C. $\frac{3}{4}$ D. $\frac{7}{9}$ E. $\frac{5}{6}$ 
13. A three-digit integer contains one of each digits 1, 3, and 5. What is the probability the integer is divisible by 5? A. $\frac{1}{6}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$ E. $\frac{5}{6}$	14. Austin and Temple are 50 miles apart along I-35. Bonnie drove from Austin to Temple averaging 60 mph, then rode a bus back averaging 40 mph. What was her average speed for the round trip? A. 46 B. 48 C. 50 D. 52 E. 54
15. A recipe making 5 servings needs 2 squares chocolate, $\frac{1}{4}$ cup sugar, 1 cup water, and 4 cups milk. Jordan has 5 squares chocolate, 2 cups sugar, lots of water, and 7 cups milk. Keeping ratios, what is the greatest number of servings he can make? A. $5\frac{1}{8}$ B. $6\frac{1}{4}$ C. $7\frac{1}{2}$ D. $8\frac{3}{4}$ E. $9\frac{7}{8}$	16. How many 3-digit positive integers have digits whose product equals 24? A. 12 B. 15 C. 18 D. 21 E. 24
17. Positive integers x and y are the smallest such that $360 \cdot x$ is a square and $360 \cdot y$ is a cube. What is $x + y$? A. 80 B. 85 C. 115 D. 165 E. 610	18. A 7-ft by 7-ft floor is tiled with 1-sq-ft light and dark tiles; the four corners are dark. If a 15-ft by 15-ft floor is tiled the same way, how many dark tiles are needed? A. 49 B. 57 C. 64 D. 96 E. 126 
19. Two angles of an isosceles triangle measure 70° and x°. What is the sum of the three possible values of x? A. 95 B. 125 C. 140 D. 165 E. 180	20. How many non-congruent triangles have vertices at three of the eight points in the array shown? A. 5 B. 6 C. 7 D. 8 E. 9 
21. A 40×75 rectangular array has numbers. Andy sums each row; the average of his 40 sums is A. Bethany sums each column; the average of her 75 sums is B. What is A/B? A. $\frac{64}{225}$ B. $\frac{8}{15}$ C. 1 D. $\frac{15}{8}$ E. $\frac{225}{64}$	22. How many whole numbers between 1 and 1000 do not contain the digit 1? A. 512 B. 648 C. 720 D. 728 E. 800

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

23. Mrs. Wonderful brought 400 jelly beans, gave each boy as many as there were boys and each girl as many as there were girls, and had 6 left. There were two more boys than girls. How many students were in her class?

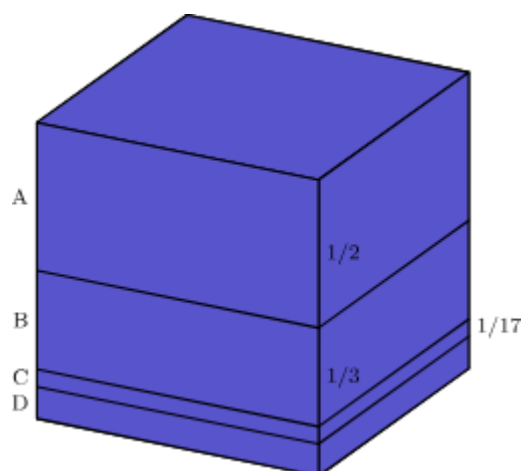
- A. 26
- B. 28
- C. 30
- D. 32
- E. 34

24. The letters A, B, C, and D represent digits. If $AB + CA = AD$ and $AB - CA = A$, what digit does D represent?

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

25. A one-cubic-foot cube is cut into four pieces by three cuts parallel to the top face: the first $\frac{1}{2}$ ft from the top, the second $\frac{1}{3}$ ft below the first, the third $\frac{1}{17}$ ft below the second. From top to bottom the pieces are labeled A, B, C, D. The pieces are then glued end to end. What is the total surface area of the new solid (sq ft)?

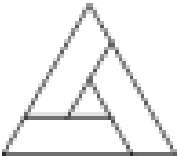
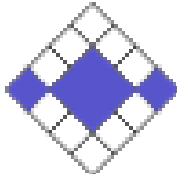
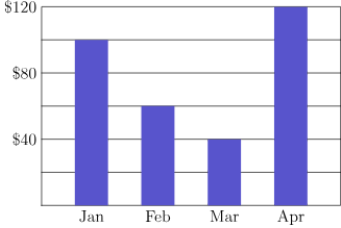
- A. 6
- B. 7
- C. $\frac{419}{51}$
- D. $\frac{158}{17}$
- E. 11



Answer Key:

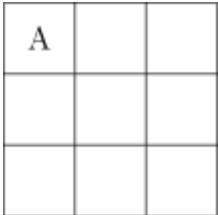
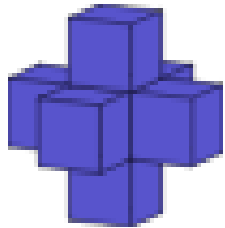
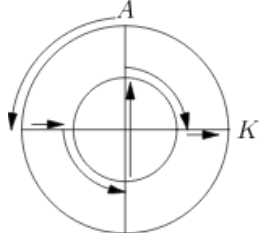
- 1. E
- 2. D
- 3. C
- 4. B
- 5. D
- 6. A
- 7. C
- 8. B
- 9. B
- 10. D
- 11. D
- 12. D
- 13. B
- 14. B
- 15. D
- 16. D
- 17. B
- 18. C
- 19. D
- 20. D
- 21. D
- 22. D
- 23. B
- 24. E
- 25. E

AMC 2008

1. Susan had \$50 to spend at the carnival. She spent \$12 on food and twice as much on rides. How many dollars did she have left to spend? A. 12 B. 14 C. 26 D. 38 E. 50	2. The ten-letter code BEST OF LUCK represents the ten digits 0–9, in order. What 4-digit number is represented by the code word CLUE? A. 8671 B. 8672 C. 9781 D. 9782 E. 9872
3. If February is a month that contains Friday the 13th, what day of the week is February 1? A. Sunday B. Monday C. Wednesday D. Thursday E. Saturday	4. In the figure, the outer equilateral triangle has area 16, the inner equilateral triangle has area 1, and the three trapezoids are congruent. What is the area of one of the trapezoids? A. 3 B. 4 C. 5 D. 6 E. 7 
5. Barney Schwinn notices that the odometer on his bicycle reads 1441, a palindrome. After riding 4 more hours that day and 6 the next, he sees another palindrome, 1661. What was his average speed in miles per hour? A. 15 B. 16 C. 18 D. 20 E. 22	6. In the figure, what is the ratio of the area of the colored squares to the area of the uncolored squares? A. 3:10 B. 3:8 C. 3:7 D. 3:5 E. 1:1 
7. If $\frac{3}{5} = \frac{M}{45} = \frac{N}{60}$, what is $M+N$? A. 27 B. 29 C. 45 D. 105 E. 127	8. Candy sales from the Boosters Club from January through April are shown. What were the average sales per month in dollars? A. 60 B. 70 C. 75 D. 80 E. 85 
9. In 2005 Tycoon Tammy invested \$100 for two years. During the first year her investment suffered a 15% loss, and during the second year the remaining investment showed a 20% gain. Over the two-year period, what was the change in Tammy's investment? A. 5% loss B. 2% loss C. 1% gain D. 2% gain E. 5% gain	10. The average age of the 6 people in Room A is 40. The average age of the 4 people in Room B is 25. If the two groups are combined, what is the average age of all the people? A. 32.5 B. 33 C. 33.5 D. 34 E. 35

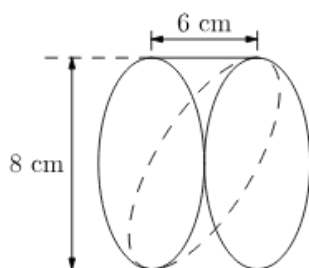
AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

11. Each of the 39 students in the eighth grade at Lincoln Middle School has one dog or one cat or both. Twenty students have a dog and 26 students have a cat. How many students have both a dog and a cat? A. 7 B. 13 C. 19 D. 39 E. 46	12. A ball is dropped from a height of 3 meters. On its first bounce it rises to a height of 2 meters. It keeps falling and bouncing to $\frac{2}{3}$ of the previous height. On which bounce will it not rise to a height of 0.5 meters? A. 3 B. 4 C. 5 D. 6 E. 7
13. Three boxes are weighed in pairs: 122 lb, 125 lb, and 127 lb. What is the combined weight of the three boxes? A. 160 B. 170 C. 187 D. 195 E. 354	14. Three A's, three B's, and three C's are placed in a 3×3 grid so each row and column contains one of each letter. If A is in the upper-left corner, how many arrangements are possible? A. 2 B. 3 C. 4 D. 5 E. 6 
15. In Theresa's first 8 basketball games, she scored 7, 4, 3, 6, 8, 3, 1, and 5 points. In her ninth game, she scored fewer than 10 points and her 9-game average was an integer. In her tenth game, she scored fewer than 10 and her 10-game average was also an integer. What is the product of her ninth- and tenth-game points? A. 35 B. 40 C. 48 D. 56 E. 72	16. A shape is created by joining seven unit cubes (as shown). What is the ratio of the volume (cubic units) to the surface area (square units)? A. 1:6 B. 7:36 C. 1:5 D. 7:30 E. 6:25 
17. Ms. Osborne asks each student to draw a rectangle with integer side lengths and perimeter 50 units, then compute its area. What is the difference between the largest and smallest possible areas? A. 76 B. 120 C. 128 D. 132 E. 136	18. Two concentric circles have radii 10 m and 20 m. An aardvark runs along the path shown, starting at A and ending at K. How many meters does it run? A. $10\pi + 20$ B. $10\pi + 30$ C. $10\pi + 40$ D. $20\pi + 20$ E. $20\pi + 40$ 
19. Eight points are spaced at unit intervals around a 2×2 square (as shown). Two of the 8 points are chosen at random. What is the probability they are one unit apart? A. $\frac{1}{4}$ B. $\frac{2}{7}$ C. $\frac{4}{11}$ D. $\frac{1}{2}$ E. $\frac{4}{7}$ 	20. Two-thirds of the boys and $\frac{3}{4}$ of the girls passed a test, and an equal number of boys and girls passed. What is the minimum possible number of students in the class? A. 12 B. 17 C. 24 D. 27 E. 36

21. Jerry cuts a wedge from a 6-cm-high cylinder of bologna as shown. Which answer choice is closest to the wedge's volume (cm^3)?

- A. 48
- B. 75
- C. 151
- D. 192
- E. 603

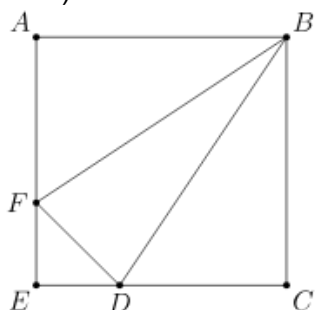


22. For how many positive integers n are both cube root of n and 3 times the cube root of n three-digit whole numbers?

- A. 12
- B. 21
- C. 27
- D. 33
- E. 34

23. In square $ABCE$, $AF = 2 \cdot FE$ and $CD = 2 \cdot DE$. What is the ratio of area($\triangle BFD$) to area(square $ABCE$)?

- A. $1/6$
- B. $2/9$
- C. $5/18$
- D. $1/3$
- E. $7/20$



24. Ten tiles numbered 1 through 10 are face down. One tile is turned up at random, and a die is rolled. What is the probability that the product of the tile and die numbers is a perfect square?

- A. $1/10$
- B. $1/6$
- C. $11/60$
- D. $1/5$
- E. $7/30$

25. Concentric circles have radii 2, 4, 6, 8, 10, and 12 inches. The shaded bands are every other ring (dark regions). Which is closest to the percent of the design that is dark-colored?

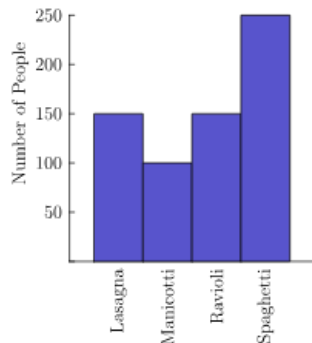
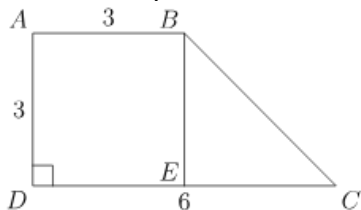
- A. 42
- B. 44
- C. 45
- D. 46
- E. 48



Answer Key:

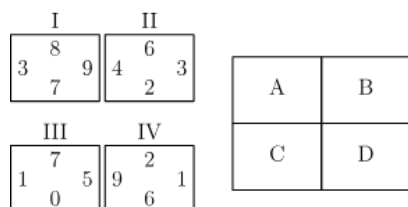
- 1. B
- 2. A
- 3. A
- 4. C
- 5. E
- 6. D
- 7. E
- 8. D
- 9. D
- 10. D
- 11. A
- 12. C
- 13. C
- 14. C
- 15. B
- 16. D
- 17. D
- 18. E
- 19. B
- 20. B
- 21. C
- 22. A
- 23. C
- 24. C
- 25. A

AMC 2007

1. Theresa's parents have agreed to buy her tickets to see her favorite band if she spends an average of 10 hours per week helping around the house for 6 weeks. For the first 5 weeks she helps for 8, 11, 7, 12 and 10 hours. How many hours must she work for the final week to earn the tickets? A. 9 B. 10 C. 11 D. 12 E. 13	2. 650 students were surveyed about their pasta preferences (lasagna, manicotti, ravioli, spaghetti). The bar graph shows the results. What is the ratio of the number of students who preferred spaghetti to the number who preferred manicotti? A. $\frac{2}{5}$ B. $\frac{1}{2}$ C. $\frac{5}{4}$ D. $\frac{5}{3}$ E. $\frac{5}{2}$  <table><caption>Pasta Preferences Data</caption><thead><tr><th>Pasta Type</th><th>Number of People</th></tr></thead><tbody><tr><td>Lasagna</td><td>150</td></tr><tr><td>Manicotti</td><td>100</td></tr><tr><td>Ravioli</td><td>150</td></tr><tr><td>Spaghetti</td><td>250</td></tr></tbody></table>	Pasta Type	Number of People	Lasagna	150	Manicotti	100	Ravioli	150	Spaghetti	250						
Pasta Type	Number of People																
Lasagna	150																
Manicotti	100																
Ravioli	150																
Spaghetti	250																
3. What is the sum of the two smallest prime factors of 250? A. 2 B. 5 C. 7 D. 10 E. 12	4. A haunted house has six windows. In how many ways can Georgie the Ghost enter by one window and leave by a different window? A. 12 B. 15 C. 18 D. 30 E. 36																
5. Chandler wants to buy a 500 dollar mountain bike. For his birthday, he receives 50 dollars from his grandparents, 35 dollars from his aunt, and 15 dollars from his cousin. He earns 16 dollars per week on his paper route and will use all money received and earned. In how many weeks will he be able to buy the bike? A. 24 B. 25 C. 26 D. 27 E. 28	6. The average cost of a long-distance call in the USA in 1985 was 41 cents per minute; in 2005 it was 7 cents per minute. Find the approximate percent decrease. A. 7 B. 17 C. 34 D. 41 E. 80																
7. The average age of 5 people in a room is 30 years. An 18-year-old leaves. What is the average age of the four remaining people? A. 25 B. 26 C. 29 D. 33 E. 36	8. In trapezoid ABCD, AD is perpendicular to DC, AD = AB = 3, and DC = 6. Point E is on DC and BE is parallel to AD. Find the area of triangle BEC. 																
9. To complete the grid below, each of the digits 1 through 4 must occur once in each row and once in each column. What number will occupy the lower right-hand square? A. 1 B. 2 C. 3 D. 4 E. cannot be determined <table data-bbox="738 2261 923 2441"><tr><td>1</td><td></td><td>2</td><td></td></tr><tr><td>2</td><td>3</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>4</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	1		2		2	3						4					10. For any positive integer n, define $n^\wedge$ to be the sum of the positive factors of n. For example, $6^\wedge = 12$. Find $11^\wedge$. A. 13 B. 20 C. 24 D. 28 E. 30
1		2															
2	3																
			4														

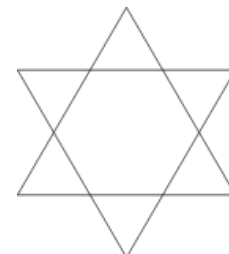
11. Tiles I, II, III, IV are translated so one tile coincides with each of rectangles A, B, C, D. In the final arrangement, the two numbers on any side common to adjacent tiles must match. Which tile is translated to rectangle C?

- A. I
B. II
C. III
D. IV
E. cannot be determined



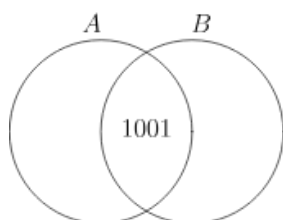
12. A unit hexagram is composed of a regular hexagon of side length 1 and its 6 equilateral triangular extensions. What is the ratio of the area of the extensions to the area of the original hexagon?

- A. 1:1
B. 6:5
C. 3:2
D. 2:1
E. 3:1



13. Sets A and B have the same number of elements. Their union has 2007 elements and their intersection has 1001 elements. How many elements are in A?

- A. 503
B. 1006
C. 1504
D. 1507
E. 1510



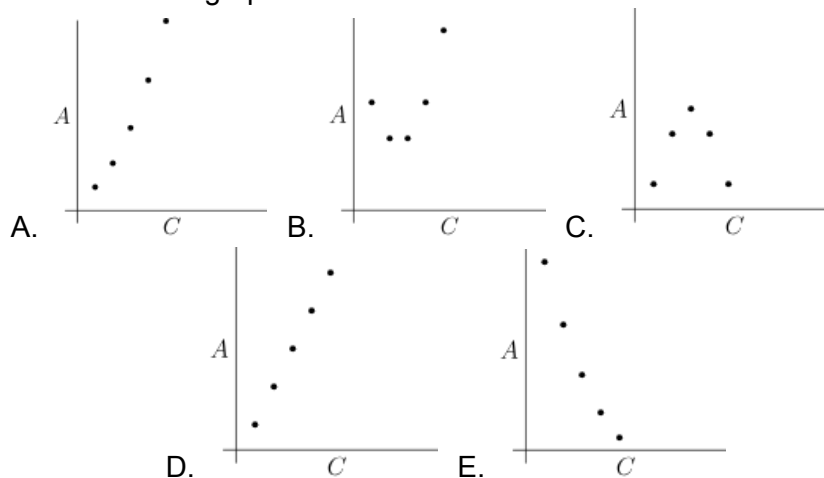
14. The base of isosceles triangle ABC is 24 and its area is 60. What is the length of one of the congruent sides?

- A. 5
B. 8
C. 13
D. 14
E. 18

15. Let a, b, c be numbers with $0 < a < b < c$. Which of the following is impossible?

- A. $a + c < b$
B. $a \cdot b < c$
C. $a + b < c$
D. $a \cdot c < b$
E. $b/c = a/c$

16. Amanda draws five circles with radii 1, 2, 3, 4, 5. For each circle she plots the point (C, A) , where C is circumference and A is area. Which graph could be hers?



17. A mixture of 30 liters of paint is 25% red tint, 30% yellow tint, and 45% water. Five liters of yellow tint are added. What is the percent of yellow tint in the new 35-liter mixture?

- A. 25
B. 35
C. 40
D. 45
E. 50

18. The product of the two 99-digit numbers 303,030,303,...,030,303 and 505,050,505,...,050,505 has thousands digit A and units digit B. What is $A + B$?

- A. 3
B. 5
C. 6
D. 8
E. 10

19. Pick two consecutive positive integers whose sum is less than 100. Square both and find the difference of the squares. Which of the following could be the difference?

- A. 2
B. 64
C. 79
D. 96
E. 131

20. Before district play, the Unicorns had won 45% of their basketball games. During district play, they won six more and lost two, and finished the season having won half their games. How many games did they play in all?

- A. 48
B. 50
C. 52
D. 54
E. 60

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

21. Two cards are dealt from a deck of four red cards labeled A, B, C, D and four green cards labeled A, B, C, D. A winning pair is two of the same color or two of the same letter. What is the probability of drawing a winning pair?

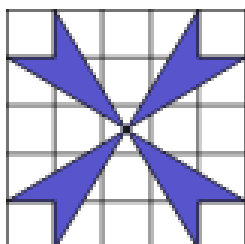
- A. $\frac{2}{7}$
- B. $\frac{3}{8}$
- C. $\frac{1}{2}$
- D. $\frac{4}{7}$
- E. $\frac{5}{8}$

22. A lemming starts at a corner of a square of side length 10 meters, runs 6.2 meters along a diagonal toward the opposite corner, turns right 90 degrees, and runs 2 more meters. A scientist measures the shortest distance from the lemming to each side of the square. What is the average of these four distances (meters)?

- A. 2
- B. 4.5
- C. 5
- D. 6.2
- E. 7

23. What is the area of the shaded pinwheel shown in the 5×5 grid?

- A. 4
- B. 6
- C. 8
- D. 10
- E. 12

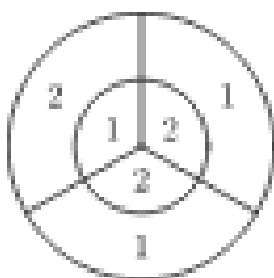


24. A bag contains four pieces of paper labeled 1, 2, 3, 4 (no repeats). Three pieces are drawn one at a time without replacement to form a three-digit number. What is the probability the three-digit number is a multiple of 3?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{2}{3}$
- E. $\frac{3}{4}$

25. On a dart board, the outer circle has radius 6 and the inner circle has radius 3. Three radii divide each circle into three congruent regions, with point values shown. Probability of hitting a region is proportional to its area. Two darts are thrown and the score is the sum of the regions' values. What is the probability the score is odd?

- A. $\frac{17}{36}$
- B. $\frac{35}{72}$
- C. $\frac{1}{2}$
- D. $\frac{37}{72}$
- E. $\frac{19}{36}$



Answer Key:

- 1. D
- 2. E
- 3. C
- 4. D
- 5. B
- 6. E
- 7. D
- 8. B
- 9. B
- 10. D
- 11. D
- 12. A
- 13. C
- 14. C
- 15. A
- 16. A
- 17. C
- 18. D
- 19. C
- 20. A
- 21. D
- 22. C
- 23. B
- 24. C
- 25. B

AMC 2006

1. Mindy made three purchases for \$1.98, \$5.04, and \$9.89. What was her total, to the nearest dollar?

- A. \$10
- B. \$15
- C. \$16
- D. \$17
- E. \$18

2. On the AMC 8 contest Billy answers 13 questions correctly, answers 7 questions incorrectly and doesn't answer the last 5. What is his score?

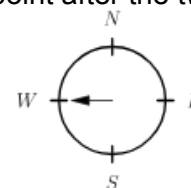
- A. 1
- B. 6
- C. 13
- D. 19
- E. 26

3. Elisa swims laps in the pool. When she first started, she completed 10 laps in 25 minutes. Now, she can finish 12 laps in 24 minutes. By how many minutes has she improved her lap time?

- A. $\frac{1}{2}$
- B. $\frac{3}{4}$
- C. 1
- D. 2
- E. 3

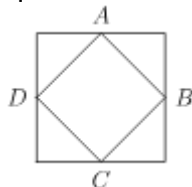
4. Initially, a spinner points west. Chenille moves it clockwise $2\frac{1}{4}$ revolutions and then counterclockwise $\frac{3}{4}$ revolutions. In what direction does the spinner point after the two moves?

- A. North
- B. East
- C. South
- D. West
- E. Northwest



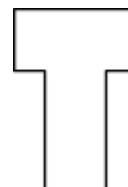
5. Points A, B, C and D are midpoints of the sides of the larger square. If the larger square has area 60, what is the area of the smaller square?

- A. 15
- B. 20
- C. 24
- D. 30
- E. 40



6. The letter T is formed by placing two 2×4 inch rectangles next to each other, as shown. What is the perimeter of the T, in inches?

- A. 12
- B. 16
- C. 20
- D. 22
- E. 24



7. Circle X has a radius of π . Circle Y has a circumference of 8π . Circle Z has an area of 9π . List the circles in order from smallest to largest radius.

- A. X, Y, Z
- B. Z, X, Y
- C. Y, X, Z
- D. Z, Y, X
- E. X, Z, Y

8. The table shows some of the results of a survey by radio station KAMC. What percentage of the males surveyed listen to the station?

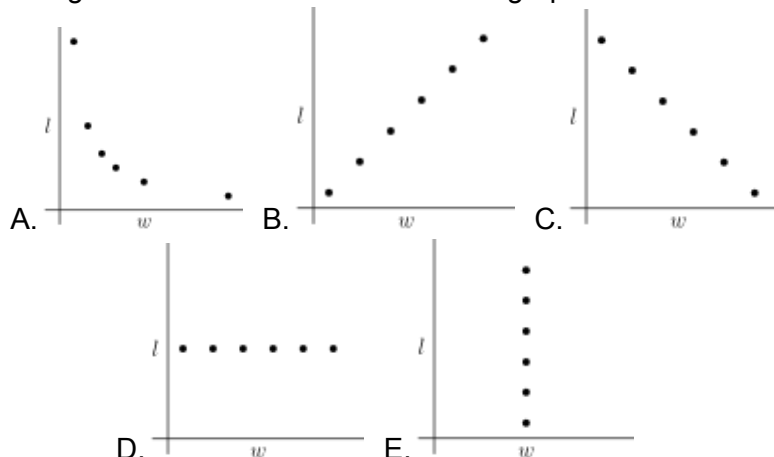
- A. 39
- B. 48
- C. 52
- D. 55
- E. 75

	Listen	Don't Listen	Total
Male	?	26	?
Female	58	?	96
Total	136	64	200

9. What is the product of $\frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \dots \times \frac{2006}{2005}$?

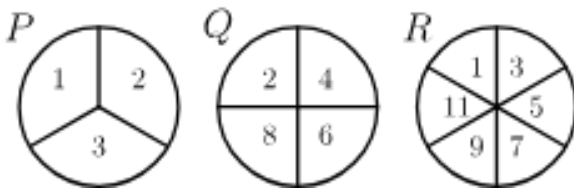
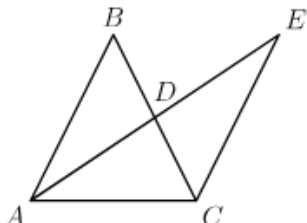
- A. 1
- B. 1002
- C. 1003
- D. 2005
- E. 2006

10. Jorge's teacher asks him to plot all the ordered pairs (w, l) of positive integers for which w is the width and l is the length of a rectangle with area 12. What should his graph look like?



AI HOMEWORK

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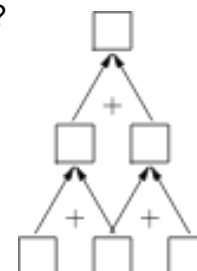
11. How many two-digit numbers have digits whose sum is a perfect square? A. 13 B. 16 C. 17 D. 18 E. 19	12. Antonette gets 70% on a 10-problem test, 80% on a 20-problem test and 90% on a 30-problem test. If the three tests are combined into one 60-problem test, which percent is closest to her overall score? A. 40 B. 77 C. 80 D. 83 E. 87
13. Cassie leaves Escanaba at 8:30 AM heading for Marquette on her bike at 12 miles per hour. Brian leaves Marquette at 9:00 AM heading for Escanaba on his bike at 16 miles per hour. They both bike on the same 62-mile route between Escanaba and Marquette. At what time in the morning do they meet? A. 10:00 B. 10:15 C. 10:30 D. 11:00 E. 11:30	14. The students in Mrs. Reed's English class are reading the same 760-page novel. Three friends, Alice, Bob and Chandra, are in the class. Alice reads a page in 20 seconds, Bob in 45 seconds and Chandra in 30 seconds. If Bob and Chandra both read the whole book, Bob will spend how many more seconds reading than Chandra? A. 7,600 B. 11,400 C. 12,500 D. 15,200 E. 22,800
15. The students in Mrs. Reed's English class are reading the same 760-page novel. Alice reads a page in 20 seconds, Bob in 45 seconds, and Chandra in 30 seconds. Chandra and Bob decide to "team read": Chandra reads from page 1 to a certain page and Bob reads from the next page through page 760. What is the last page that Chandra should read so that they spend the same amount of time reading? A. 425 B. 444 C. 456 D. 484 E. 506	16. The students in Mrs. Reed's English class are reading the same 760-page novel. Alice reads a page in 20 seconds, Bob in 45 seconds and Chandra in 30 seconds. If they divide the book into three sections so that each reads for the same length of time, how many seconds will each have to read? A. 6400 B. 6600 C. 6800 D. 7000 E. 7200
17. Jeff rotates spinners P, Q and R and adds the resulting numbers. What is the probability that his sum is an odd number? A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$ E. $\frac{3}{4}$ 	18. A cube with 3-inch edges is made using 27 cubes with 1-inch edges. Nineteen of the smaller cubes are white and eight are black. If the eight black cubes are placed at the corners of the larger cube, what fraction of the surface area of the larger cube is white? A. $\frac{1}{9}$ B. $\frac{1}{4}$ C. $\frac{4}{9}$ D. $\frac{5}{9}$ E. $\frac{19}{27}$
19. Triangle ABC is an isosceles triangle with $AB = BC$. Point D is the midpoint of BC and AE, and CE is 11 units long. Triangle ABD is congruent to triangle ECD. What is the length of BD? A. 4 B. 4.5 C. 5 D. 5.5 E. 6 	20. A singles tournament had six players. Each player played every other player only once, with no ties. If Helen won 4 games, Ines won 3, Janet won 3, Kendra won 2 and Lara won 2, how many games did Monica win? A. 0 B. 1 C. 2 D. 3 E. 4

21. An aquarium has a rectangular base that measures 100 cm by 40 cm and has a height of 50 cm. The aquarium is filled with water to a depth of 37 cm. A rock with volume 1000 cm^3 is then placed in the aquarium and completely submerged. By how many centimeters does the water level rise?

- A. 0.25
- B. 0.5
- C. 1
- D. 1.25
- E. 2.5

22. Three different one-digit positive integers are placed in the bottom row of cells. Numbers in adjacent cells are added and the sum is placed in the cell above them. In the second row, continue the same process to obtain a number in the top cell. What is the difference between the largest and smallest numbers possible in the top cell?

- A. 16
- B. 24
- C. 25
- D. 26
- E. 35



23. A box contains gold coins. If the coins are equally divided among six people, four coins are left over. If the coins are equally divided among five people, three coins are left over. If the box holds the smallest number of coins that meets these two conditions, how many coins are left when equally divided among seven people?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 5

24. In the multiplication problem below A, B, C, D are different digits. What is $A + B$?

$$ABA \times CD = CDCD$$

- A. 1
- B. 2
- C. 3
- D. 4
- E. 9

25. Barry wrote 6 different numbers, one on each side of 3 cards, and laid the cards on a table, as shown. The sums of the two numbers on each of the three cards are equal. The three numbers on the hidden sides are prime numbers. What is the average of the hidden prime numbers?

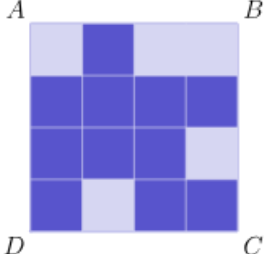
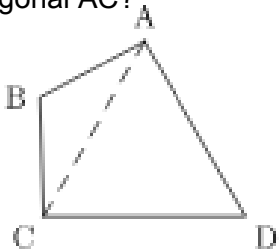
- A. 13
- B. 14
- C. 15
- D. 16
- E. 17



Answer Key:

- 1. D
- 2. C
- 3. A
- 4. B
- 5. D
- 6. C
- 7. B
- 8. E
- 9. C
- 10. A
- 11. C
- 12. D
- 13. D
- 14. B
- 15. C
- 16. E
- 17. B
- 18. D
- 19. D
- 20. C
- 21. A
- 22. D
- 23. A
- 24. A
- 25. B

AMC 2005

1. Connie multiplies a number by 2 and gets 60 as her answer. However, she should have divided the number by 2 to get the correct answer. What is the correct answer? A. 7.5 B. 15 C. 30 D. 120 E. 240	2. Karl bought five folders from Pay-A-Lot at a cost of \$2.50 each. Pay-A-Lot had a 20%-off sale the following day. How much could Karl have saved on the purchase by waiting a day? A. \$1.00 B. \$2.00 C. \$2.50 D. \$2.75 E. \$5.00
3. What is the minimum number of small squares that must be colored dark so that a line of symmetry lies on the diagonal BD of square ABCD?  A. 1 B. 2 C. 3 D. 4 E. 5	4. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6.1 cm, 8.2 cm, and 9.7 cm. What is the area of the square (in square centimeters)? A. 24 B. 25 C. 36 D. 48 E. 64
5. Soda is sold in packs of 6, 12, and 24 cans. What is the minimum number of packs needed to buy exactly 90 cans of soda? A. 4 B. 5 C. 6 D. 8 E. 15	6. Suppose d is a digit. For how many values of d is $2.00d5 > 2.005$? A. 0 B. 4 C. 5 D. 6 E. 10
7. Bill walks $\frac{1}{2}$ mile south, then $\frac{3}{4}$ mile east, and finally $\frac{1}{2}$ mile south. How many miles is he, in a direct line, from his starting point? A. 1 B. $1\frac{1}{4}$ C. $1\frac{1}{2}$ D. $1\frac{3}{4}$ E. 2	8. Suppose m and n are positive odd integers. Which of the following must also be an odd integer? A. $m + 3n$ B. $3m - n$ C. $3m^2 + 3n^2$ D. $(nm + 3)^2$ E. $3mn$
9. In quadrilateral ABCD, sides AB and BC both have length 10, sides CD and DA both have length 17, and the measure of angle ADC is 60°. What is the length of diagonal AC?  A. 13.5 B. 14 C. 15.5 D. 17 E. 18.5	10. Joe had walked halfway from home to school when he realized he was late. He ran the rest of the way to school. He ran 3 times as fast as he walked. Joe took 6 minutes to walk halfway to school. How many minutes did it take Joe to get from home to school? A. 7 B. 7.3 C. 7.7 D. 8 E. 8.3

AI HOMEWORK

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11. The sales tax rate in Bergville is 6%. During a sale at the Bergville Coat Closet, the price of a coat is discounted 20% from its \$90.00 price. Two clerks, Jack and Jill, calculate the bill independently. Jack rings up \$90.00 and adds 6% sales tax, then subtracts 20% from this total. Jill rings up \$90.00, subtracts 20% of the price, then adds 6% of the discounted price for sales tax. What is Jack's total minus Jill's total?

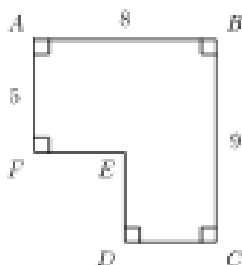
- A. -\$1.06
- B. -\$0.53
- C. \$0
- D. \$0.53
- E. \$1.06

12. Big Al, the ape, ate 100 bananas from May 1 through May 5. Each day he ate six more bananas than on the previous day. How many bananas did Big Al eat on May 5?

- A. 20
- B. 22
- C. 30
- D. 32
- E. 34

13. The area of polygon ABCDEF is 52 with $AB = 8$, $BC = 9$, and $FA = 5$. What is $DE + EF$?

- A. 7
- B. 8
- C. 9
- D. 10
- E. 11



14. The Little Twelve Basketball Conference has two divisions, with six teams in each division. Each team plays each of the other teams in its own division twice and every team in the other division once. How many conference games are scheduled?

- A. 80
- B. 96
- C. 100
- D. 108
- E. 192

15. How many different isosceles triangles have integer side lengths and perimeter 23?

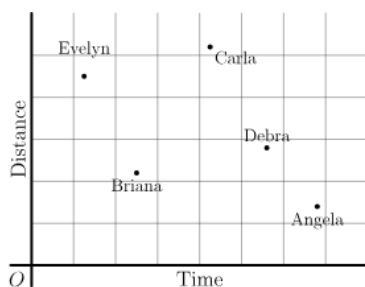
- A. 2
- B. 4
- C. 6
- D. 9
- E. 11

16. A five-legged Martian has a drawer full of socks, each of which is red, white, or blue, and there are at least five socks of each color. The Martian pulls out one sock at a time without looking. How many socks must the Martian remove from the drawer to be certain there will be 5 socks of the same color?

- A. 6
- B. 9
- C. 12
- D. 13
- E. 15

17. The results of a cross-country team's training run are graphed below. Which student has the greatest average speed?

- A. Angela
- B. Briana
- C. Carla
- D. Debra
- E. Evelyn

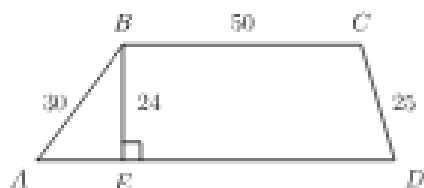


18. How many three-digit numbers are divisible by 13?

- A. 7
- B. 67
- C. 69
- D. 76
- E. 77

19. What is the perimeter of trapezoid ABCD?

- A. 180
- B. 188
- C. 196
- D. 200
- E. 204



20. Alice and Bob play a game involving a circle whose circumference is divided by 12 equally spaced points. The points are numbered clockwise from 1 to 12. Both start on point 12. Alice moves clockwise and Bob counterclockwise. In a turn of the game, Alice moves 5 points clockwise and Bob moves 9 points counterclockwise. The game ends when they stop on the same point. How many turns will this take?

- A. 6
- B. 8
- C. 12
- D. 14
- E. 24

21. How many distinct triangles can be drawn using three of the dots below as vertices?

- A. 9
- B. 12
- C. 18
- D. 20
- E. 24

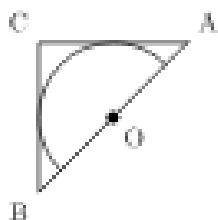


22. A company sells detergent in three different sized boxes: small (S), medium (M), and large (L). The medium size costs 50% more than the small size and contains 20% less detergent than the large size. The large size contains twice as much detergent as the small size and costs 30% more than the medium size. Rank the three sizes from best to worst buy.

- A. S M L
- B. L M S
- C. M S L
- D. L S M
- E. M L S

23. Isosceles right triangle ABC encloses a semicircle of area 2π . The circle has its center O on hypotenuse AB and is tangent to sides AC and BC. What is the area of triangle ABC?

- A. 6
- B. 8
- C. 3π
- D. 10
- E. 4π

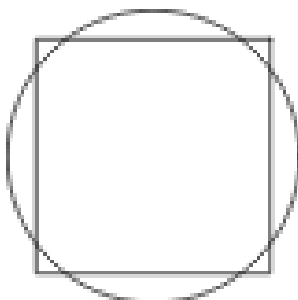


24. A certain calculator has only two keys [+1] and [$\times 2$]. Starting with the display "1," what is the fewest number of keystrokes you would need to reach "200"?

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12

25. A square with side length 2 and a circle share the same center. The total area of the regions that are inside the circle and outside the square is equal to the total area of the regions that are outside the circle and inside the square. What is the radius of the circle?

- A. $2/\sqrt{\pi}$
- B. $1 + (\sqrt{2})/2$
- C. $3/\sqrt{2}$
- D. $3/\sqrt{3}$
- E. $\sqrt{\pi}$



Answer Key:

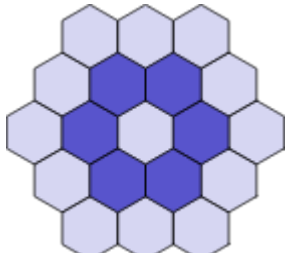
- 1. B
- 2. C
- 3. D
- 4. C
- 5. B
- 6. C
- 7. B
- 8. E
- 9. D
- 10. D
- 11. C
- 12. D
- 13. C
- 14. B
- 15. C
- 16. D
- 17. E
- 18. C
- 19. A
- 20. A
- 21. C
- 22. E
- 23. B
- 24. B
- 25. A

AI HOMEWORK

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AMC 2004

1. On a map, a 12-centimeter length represents 72 kilometers. How many kilometers does a 17-centimeter length represent? A. 6 B. 102 C. 204 D. 864 E. 1224	2. How many different four-digit numbers can be formed by rearranging the four digits in 2004? A. 4 B. 6 C. 16 D. 24 E. 81
3. Twelve friends met for dinner and each ordered one meal. The portions were so large, there was enough food for 18 people. If they shared, how many meals should they have ordered to have just enough food for the 12 of them? A. 8 B. 9 C. 10 D. 15 E. 18	4. Ms. Hamilton's class has Lance, Sally, Joy, and Fred chosen for a three-person team. In how many ways can the three starters be chosen? A. 2 B. 4 C. 6 D. 8 E. 10
5. A three-person-team basketball tournament eliminates the losing team each game. If 16 teams compete, how many games will be played to determine the winner? A. 4 B. 7 C. 8 D. 15 E. 16	6. After Sally takes 20 shots, she has made 55% of them. After she takes 5 more shots, she raises her percentage to 56%. How many of the last 5 shots did she make? A. 1 B. 2 C. 3 D. 4 E. 5
7. An athlete's target heart rate is 80% of the theoretical maximum, where maximum = $220 - \text{age}$. To the nearest whole number, what is the target heart rate of a 26-year-old? A. 134 B. 155 C. 176 D. 194 E. 243	8. Find the number of two-digit positive integers whose digits total 7. A. 6 B. 7 C. 8 D. 9 E. 10
9. The average of five numbers is 54. The average of the first two numbers is 48. What is the average of the last three numbers? A. 55 B. 56 C. 57 D. 58 E. 59	10. Handy Aaron worked $1\frac{1}{4}$ hours on Monday, 50 minutes on Tuesday, from 8:20 to 10:45 on Wednesday, and a half-hour on Friday. He is paid \$3 per hour. How much did he earn for the week? A. \$8 B. \$9 C. \$10 D. \$12 E. \$15

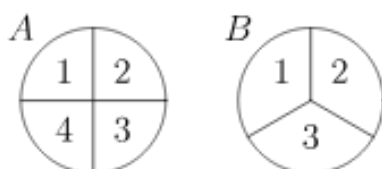
11. The numbers $-2, 4, 6, 9, 12$ are rearranged under these rules: (1) The largest isn't first, but it is in one of the first three places. (2) The smallest isn't last, but it is in one of the last three places. (3) The median isn't first or last. What is the average of the first and last numbers? A. 3.5 B. 5 C. 6.5 D. 7.5 E. 8	12. Niki's cell phone lasts 24 hours when idle and 3 hours when in constant use. Since the last recharge, her phone has been on 9 hours, with 60 minutes of use. If she doesn't use it anymore but leaves it on, how many more hours will the battery last? A. 7 B. 8 C. 11 D. 14 E. 15
13. Amy, Bill, and Celine are friends with different ages. Exactly one of the following statements is true: I) Bill is the oldest. II) Amy is not the oldest. III) Celine is not the youngest. Rank them from oldest to youngest. A. Bill, Amy, Celine B. Amy, Bill, Celine C. Celine, Amy, Bill D. Celine, Bill, Amy E. Amy, Celine, Bill	14. What is the area enclosed by the geoboard quadrilateral shown? A. 15 B. $18\frac{1}{2}$ C. $22\frac{1}{2}$ D. 27 E. 41 
15. Thirteen dark and six bright hexagonal tiles form a figure. If a new figure is created by attaching a border of bright tiles of the same size, what will be the difference between the total number of bright tiles and the total number of dark tiles in the new figure? A. 5 B. 7 C. 11 D. 12 E. 18 	16. Two 600 mL pitchers contain orange juice. One is $\frac{1}{3}$ full and the other is $\frac{2}{5}$ full. Water is added to fill each pitcher, then both pitchers are poured into one large container. What fraction of the mixture is orange juice? A. $\frac{1}{8}$ B. $\frac{3}{16}$ C. $\frac{11}{30}$ D. $\frac{11}{19}$ E. $\frac{11}{15}$
17. Three friends have a total of 6 identical pencils, and each one has at least one pencil. In how many ways can this happen? A. 1 B. 3 C. 6 D. 10 E. 12	18. Five friends each throw two darts at a target with regions scored 1 through 10. Each throw hits a different value. Scores: Alice 16, Ben 4, Cindy 7, Dave 11, Ellen 17. Who hits the region worth 6 points? A. Alice B. Ben C. Cindy D. Dave E. Ellen
19. A whole number larger than 2 leaves a remainder of 2 when divided by each of 3, 4, 5, and 6. The smallest such number lies between which two numbers? A. 40 and 49 B. 60 and 79 C. 100 and 129 D. 210 and 249 E. 320 and 369	20. Two-thirds of the people in a room are seated in three-fourths of the chairs. The rest of the people are standing. If there are 6 empty chairs, how many people are in the room? A. 12 B. 18 C. 24 D. 27 E. 36

AI HOMEWORK

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21. Spinners A and B are spun; each landing is equally likely among the numbers shown. What is the probability that the product of the two spinners' numbers is even?

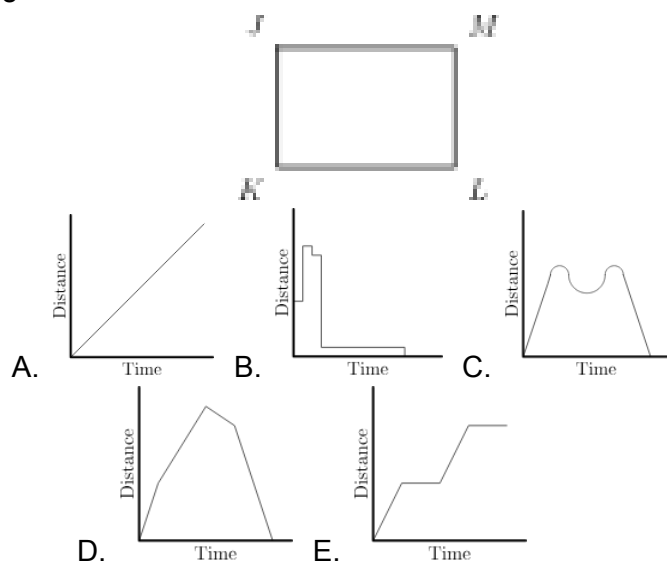
- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{2}{3}$
- E. $\frac{3}{4}$



22. At a party there are only single women and married men with their wives. The probability that a randomly selected woman is single is $\frac{2}{5}$. What fraction of the people in the room are married men?

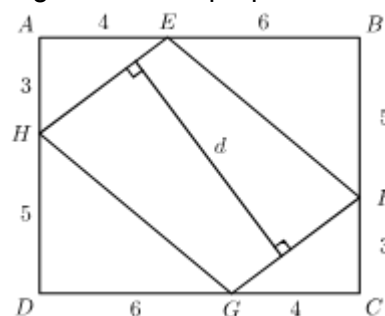
- A. $\frac{1}{3}$
- B. $\frac{3}{8}$
- C. $\frac{2}{5}$
- D. $\frac{5}{12}$
- E. $\frac{3}{5}$

23. Tess runs counterclockwise around rectangular block JKLM, starting at corner J. Which graph could represent her straight-line distance from home?



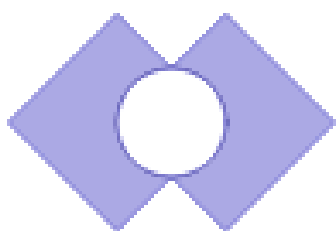
24. In the figure, ABCD is a rectangle and EFGH is a parallelogram. Using the measurements given, what is the length d of the segment that is perpendicular to HE and FG?

- A. 6.8
- B. 7.1
- C. 7.6
- D. 7.8
- E. 8.1



25. Two 4×4 squares intersect at right angles, bisecting their intersecting sides, as shown. The circle's diameter is the segment between the two points of intersection. What is the area of the shaded region created by removing the circle from the squares?

- A. $16 - 4\pi$
- B. $16 - 2\pi$
- C. $28 - 4\pi$
- D. $28 - 2\pi$
- E. $32 - 2\pi$



Answer Key:

- 1. B
- 2. B
- 3. A
- 4. B
- 5. D
- 6. C
- 7. B
- 8. B
- 9. D
- 10. E
- 11. C
- 12. B
- 13. E
- 14. C
- 15. C
- 16. C
- 17. D
- 18. A
- 19. B
- 20. D
- 21. D
- 22. B
- 23. D
- 24. C
- 25. D

AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

AMC 2003

1. Jamie counted the number of edges of a cube, Jimmy counted the numbers of corners, and Judy counted the number of faces. They then added the three numbers. What was the resulting sum? A. 12 B. 16 C. 20 D. 22 E. 26	2. Which of the following numbers has the smallest prime factor? A. 55 B. 57 C. 58 D. 59 E. 61
3. A burger at Ricky C's weighs 120 grams, of which 30 grams are filler. What percent of the burger is not filler? A. 60% B. 65% C. 70% D. 75% E. 90%	4. A group of children riding on bicycles and tricycles rode past Billy Bob's house. Billy Bob counted 7 children and 19 wheels. How many tricycles were there? A. 2 B. 4 C. 5 D. 6 E. 7
5. If 20% of a number is 12, what is 30% of the same number? A. 15 B. 18 C. 20 D. 24 E. 30	6. Given the areas of the three squares in the figure, what is the area of the interior triangle? A. 13 B. 30 C. 60 D. 300 E. 1800 
7. Blake and Jenny each took four 100-point tests. Blake averaged 78 on the four tests. Jenny scored 10 points higher than Blake on the first test, 10 points lower than him on the second test, and 20 points higher on both the third and fourth tests. What is the difference between Jenny's average and Blake's average on these four tests? A. 10 B. 15 C. 20 D. 25 E. 40	8. Who gets the fewest cookies from one batch of cookie dough? A. Art B. Roger C. Paul D. Trisha E. There is a tie for fewest
9. Art's cookies sell for 60¢ each. To earn the same amount from a single batch, how much should one of Roger's cookies cost? A. 18¢ B. 25¢ C. 40¢ D. 75¢ E. 90¢	10. How many cookies will be in one batch of Trisha's cookies? A. 10 B. 12 C. 16 D. 18 E. 24

11. Business is a little slow at Lou's Fine Shoes, so Lou decides to have a sale. On Friday, Lou increases all of Thursday's prices by 10%. Over the weekend, Lou advertises the sale: "Ten percent off the listed price. Sale starts Monday." How much does a pair of shoes cost on Monday that cost \$40 on Thursday?

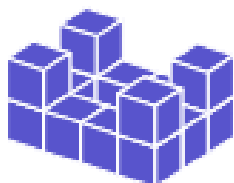
- A. \$36
- B. \$39.60
- C. \$40
- D. \$40.40
- E. \$44

12. When a fair six-sided die is tossed on a table top, the bottom face cannot be seen. What is the probability that the product of the faces that can be seen is divisible by 6?

- A. $\frac{1}{3}$
- B. $\frac{1}{2}$
- C. $\frac{2}{3}$
- D. $\frac{5}{6}$
- E. 1

13. Fourteen white cubes are put together to form the figure on the right. The complete surface of the figure, including the bottom, is painted purple. The figure is then separated into individual cubes. How many of the individual cubes have exactly four purple faces?

- A. 4
- B. 6
- C. 8
- D. 10
- E. 12



14. In this addition problem, each letter stands for a different digit.

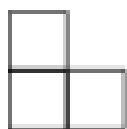
$$\text{TWO} + \text{TWO} + \text{FOUR} = ?$$

If $T = 7$ and the letter O represents an even number, what is the only possible value for W?

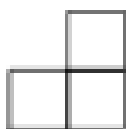
- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

15. A figure is constructed from unit cubes. Each cube shares at least one face with another cube. What is the minimum number of cubes needed to build a figure with the front and side views shown?

- A. 3
- B. 4
- C. 5
- D. 6
- E. 7



Front



Side

16. Ali, Bonnie, Carlo and Dianna are going to drive together to a nearby theme park. The car they are using has four seats: one driver's seat, one front passenger seat and two back passenger seats. Bonnie and Carlo are the only ones who know how to drive the car. How many possible seating arrangements are there?

- A. 2
- B. 4
- C. 6
- D. 12
- E. 24

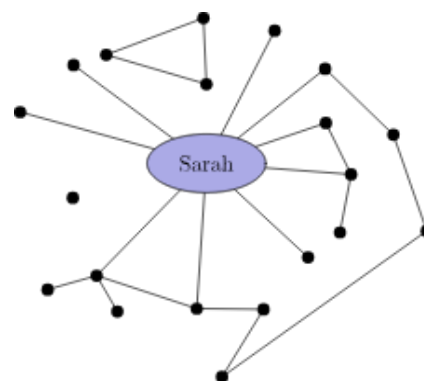
17. The six children listed below are from two families of three siblings each. Each child has blue or brown eyes and black or blond hair. Children from the same family have at least one of these characteristics in common. Which two children are Jim's siblings?

- A. Nadeen and Austin
- B. Benjamin and Sue
- C. Benjamin and Austin
- D. Nadeen and Teyvyn
- E. Austin and Sue

Child	Eye Color	Hair Color
Benjamin	Blue	Black
Jim	Brown	Blond
Nadeen	Brown	Black
Austin	Blue	Blond
Teyvyn	Blue	Black
Sue	Blue	Blond

18. Each of the twenty dots on the graph below represents one of Sarah's classmates. Classmates who are friends are connected with a line segment. For her birthday party, Sarah is inviting only the following: all of her friends and all of those classmates who are friends with at least one of her friends. How many classmates will not be invited to Sarah's party?

- A. 1
- B. 4
- C. 5
- D. 6
- E. 7



19. How many integers between 1000 and 2000 have all three of the numbers 15, 20, and 25 as factors?

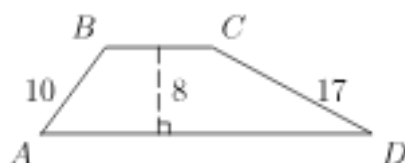
- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

20. What is the measure of the acute angle formed by the hands of the clock at 4:20 a.m.?

- A. 0°
- B. 5°
- C. 8°
- D. 10°
- E. 12°

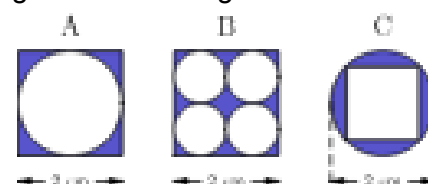
21. The area of trapezoid ABCD is 164 cm^2 . The altitude is 8 cm, AB is 10 cm, and CD is 17 cm. What is BC, in centimeters?

- A. 9
- B. 10
- C. 12
- D. 15
- E. 20

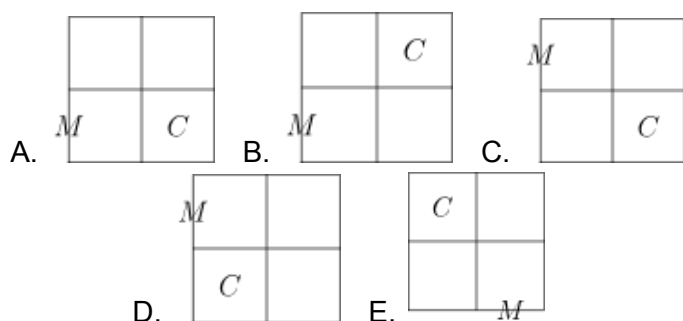
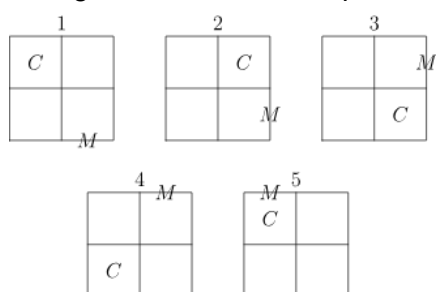


22. The following figures are composed of squares and circles. Which figure has a shaded region with the largest area?

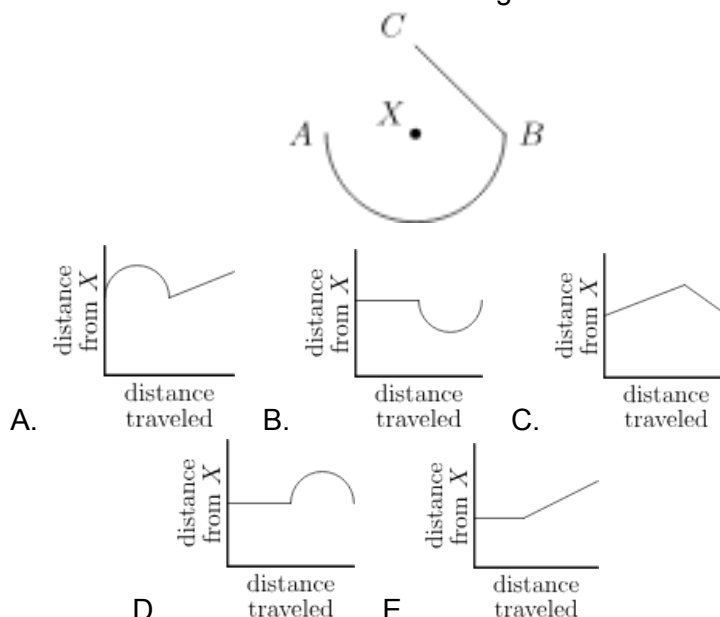
- A. A only
- B. B only
- C. C only
- D. Both A and B
- E. All are equal



23. In the pattern below, the cat moves clockwise through the four squares and the mouse moves counterclockwise through the eight exterior segments of the four squares.

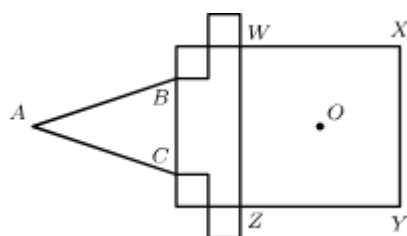


24. A ship travels from point A to point B along a semicircular path, centered at Island X. Then it travels along a straight path from B to C. Which of these graphs best shows the ship's distance from Island X as it moves along its course?



25. In the figure, the area of square WXYZ is 25 cm^2 . The four smaller squares have sides 1 cm long, either parallel to or coinciding with the sides of the large square. In triangle ABC, $AB = AC$, and when triangle ABC is folded over side BC, point A coincides with O, the center of square WXYZ. What is the area of triangle ABC, in square centimeters?

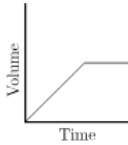
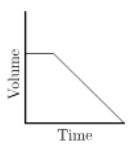
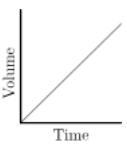
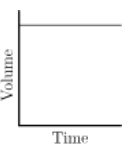
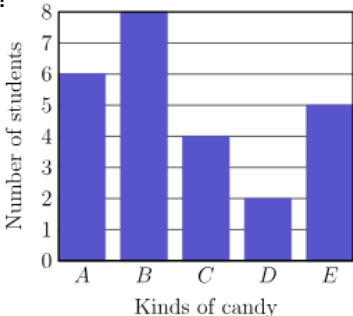
- A. $15/4$
- B. $21/4$
- C. $27/4$
- D. $21/2$
- E. $27/2$



Answer Key:

1. C
2. C
3. D
4. C
5. B
6. C
7. C
8. D
9. C
10. D
11. B
12. C
13. C
14. C
15. C
16. D
17. C
18. C
19. A
20. D
21. D
22. D
23. A
24. B
25. C

AMC 2002

1. A circle and two distinct lines are drawn on a sheet of paper. What is the largest possible number of points of intersection of these figures? A. 2 B. 3 C. 4 D. 5 E. 6	2. How many different combinations of \$5 bills and \$2 bills can be used to make a total of \$17? Order does not matter in this problem. A. 2 B. 3 C. 4 D. 5 E. 6																									
3. What is the smallest possible average of four distinct positive even integers? A. 3 B. 4 C. 5 D. 6 E. 7	4. The year 2002 is a palindrome (a number that reads the same from left to right as it does from right to left). What is the product of the digits of the next year after 2002 that is a palindrome? A. 0 B. 4 C. 9 D. 16 E. 25																									
5. Carlos Montado was born on Saturday, November 9, 2002. On what day of the week will Carlos be 706 days old? A. Monday B. Wednesday C. Friday D. Saturday E. Sunday	6. A birdbath is designed to overflow so that it will be self-cleaning. Water flows in at the rate of 20 milliliters per minute and drains at the rate of 18 milliliters per minute. One of these graphs shows the volume of water in the birdbath during the filling time and continuing into the overflow time. Which one is it? A.  B.  C.  D.  E. 																									
7. The students in Mrs. Sawyer's class were asked to do a taste test of five kinds of candy. Each student chose one kind of candy. A bar graph of their preferences is shown. What percent of her class chose candy E?  A. 5 B. 12 C. 15 D. 16 E. 20	8. Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6¢ each, Peru 4¢ each, and Spain 5¢ each. (Brazil and Peru are South American countries and France and Spain are in Europe.) Number of Stamps by Decade How many of his European stamps were issued in the '80s? A. 9 B. 15 C. 18 D. 24 E. 42 <table><tr><th>Country</th><th>'50s</th><th>'60s</th><th>'70s</th><th>'80s</th></tr><tr><td>Brazil</td><td>4</td><td>7</td><td>12</td><td>8</td></tr><tr><td>France</td><td>8</td><td>4</td><td>12</td><td>15</td></tr><tr><td>Peru</td><td>6</td><td>4</td><td>6</td><td>10</td></tr><tr><td>Spain</td><td>3</td><td>9</td><td>13</td><td>9</td></tr></table>	Country	'50s	'60s	'70s	'80s	Brazil	4	7	12	8	France	8	4	12	15	Peru	6	4	6	10	Spain	3	9	13	9
Country	'50s	'60s	'70s	'80s																						
Brazil	4	7	12	8																						
France	8	4	12	15																						
Peru	6	4	6	10																						
Spain	3	9	13	9																						

9. Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6¢ each, Peru 4¢ each, and Spain 5¢ each. (Brazil and Peru are South American countries and France and Spain are in Europe.)

Number of Stamps by Decade

His South American stamps issued before the '70s cost him

- A. \$0.40
- B. \$1.06
- C. \$1.80
- D. \$2.38
- E. \$2.64

Country	'50s	'60s	'70s	'80s
Brazil	4	7	12	8
France	8	4	12	15
Peru	6	4	6	10
Spain	3	9	13	9

10. Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6¢ each, Peru 4¢ each, and Spain 5¢ each. (Brazil and Peru are South American countries and France and Spain are in Europe.)

Number of Stamps by Decade

The average price of his '70s stamps is closest to

- A. 3.5¢
- B. 4¢
- C. 4.5¢
- D. 5¢
- E. 5.5¢

Country	'50s	'60s	'70s	'80s
Brazil	4	7	12	8
France	8	4	12	15
Peru	6	4	6	10
Spain	3	9	13	9

11. A sequence of squares is made of identical square tiles. The edge of each square is one tile length longer than the edge of the previous square. The first three squares are shown. How many more tiles does the seventh square require than the sixth?

- A. 11
- B. 12
- C. 13
- D. 14
- E. 15



12. A board game spinner is divided into three regions labeled A, B and C. The probability of the arrow stopping on region A is $\frac{1}{3}$ and on region B is $\frac{1}{2}$. The probability of the arrow stopping on region C is

- A. $\frac{1}{12}$
- B. $\frac{1}{6}$
- C. $\frac{1}{5}$
- D. $\frac{1}{3}$
- E. $\frac{2}{5}$

13. For his birthday, Bert gets a box that holds 125 jellybeans when filled to capacity. A few weeks later, Carrie gets a larger box full of jellybeans. Her box is twice as high, twice as wide and twice as long as Bert's. Approximately, how many jellybeans did Carrie get?

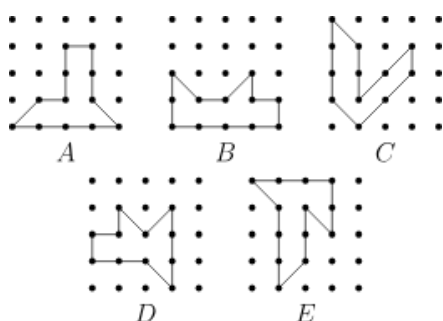
- A. 250
- B. 500
- C. 625
- D. 750
- E. 1000

14. A merchant offers a large group of items at 30% off. Later, the merchant takes 20% off these sale prices. The total discount is

- A. 35%
- B. 44%
- C. 50%
- D. 56%
- E. 60%

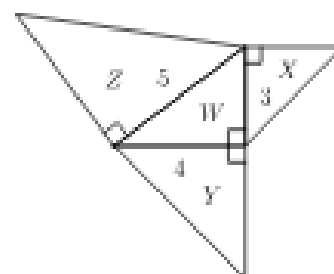
15. Which of the following polygons has the largest area?

- A. A
- B. B
- C. C
- D. D
- E. E



16. Right isosceles triangles are constructed on the sides of a 3–4–5 right triangle, as shown. A capital letter represents the area of each triangle. Which one of the following is true?

- A. $X + Z = W + Y$
- B. $W + X = Z$
- C. $3X + 4Y = 5Z$
- D. $X + W = \frac{1}{2}(Y + Z)$
- E. $X + Y = Z$

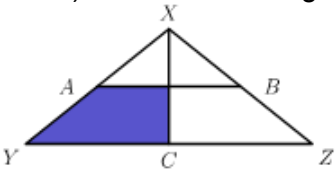
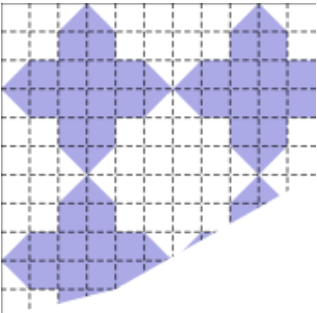


17. In a mathematics contest with ten problems, a student gains 5 points for a correct answer and loses 2 points for an incorrect answer. If Olivia answered every problem and her score was 29, how many correct answers did she have?

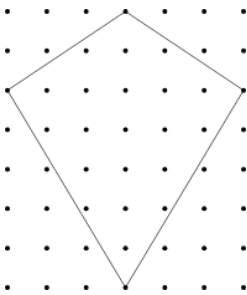
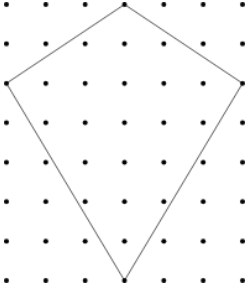
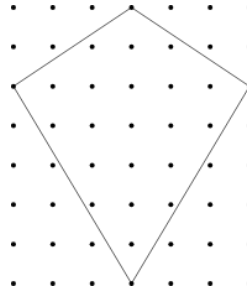
- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

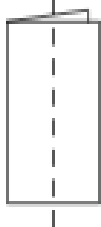
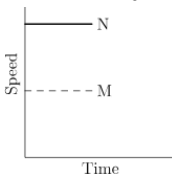
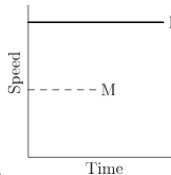
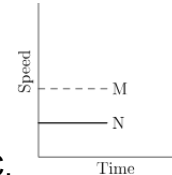
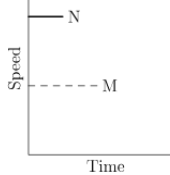
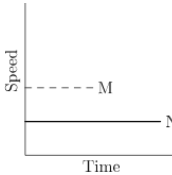
18. Gage skated 1 hr 15 min each day for 5 days and 1 hr 30 min each day for 3 days. How long would he have to skate the ninth day in order to average 85 minutes of skating each day for the entire time?

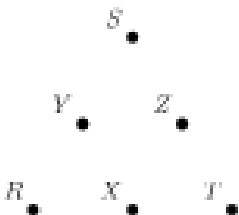
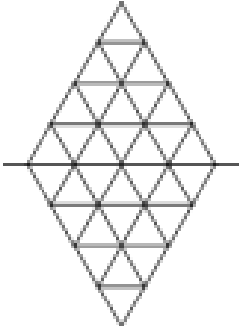
- A. 1 hr
- B. 1 hr 10 min
- C. 1 hr 20 min
- D. 1 hr 40 min
- E. 2 hr

19. How many whole numbers between 99 and 999 contain exactly one 0? A. 72 B. 90 C. 144 D. 162 E. 180	20. The area of triangle XYZ is 8 square inches. Points A and B are midpoints of congruent segments XY and XZ. Altitude XC bisects YZ. The area (in square inches) of the shaded region is A. 1 B. $1\frac{1}{2}$ C. 2 D. 3 E. $3\frac{1}{2}$ 
21. Harold tosses a coin four times. The probability that he gets at least as many heads as tails is A. $\frac{5}{16}$ B. $\frac{3}{8}$ C. $\frac{1}{2}$ D. $\frac{5}{8}$ E. $\frac{11}{16}$	22. Six cubes, each an inch on an edge, are fastened together, as shown. Find the total surface area in square inches. Include the top, bottom, and sides. A. 18 B. 24 C. 26 D. 30 E. 36 
23. A corner of a tiled floor is shown. If the entire floor is tiled in this way and each of the four corners looks like this one, then what fraction of the tiled floor is made of darker tiles? A. $\frac{1}{3}$ B. $\frac{4}{9}$ C. $\frac{1}{2}$ D. $\frac{5}{9}$ E. $\frac{5}{8}$ 	24. Miki has a dozen oranges of the same size and a dozen pears of the same size. Miki uses her juicer to extract 8 ounces of pear juice from 3 pears and 8 ounces of orange juice from 2 oranges. She makes a pear–orange juice blend from an equal number of pears and oranges. What percent of the blend is pear juice? A. 30 B. 40 C. 50 D. 60 E. 70
25. Loki, Moe, Nick and Ott are good friends. Ott had no money, but the others did. Moe gave Ott one-fifth of his money, Loki gave Ott one-fourth of his money and Nick gave Ott one-third of his money. Each gave Ott the same amount of money. What fractional part of the group's money does Ott now have? A. $\frac{1}{10}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{2}{5}$ E. $\frac{1}{2}$	Answer Key: - D - A - C - B - C - A - E - D - B - E - C - B - E - B - E - E - C - E - B - B - B - B - B

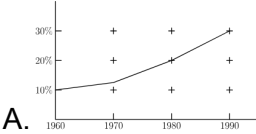
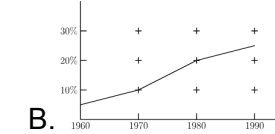
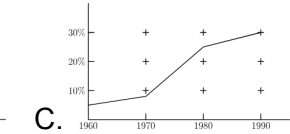
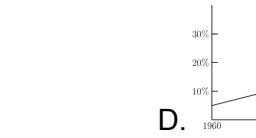
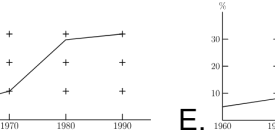
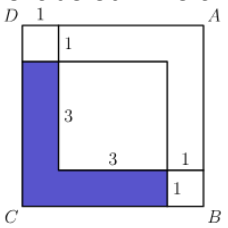
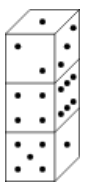
AMC 2001

1. Casey's shop class is making a golf trophy. He has to paint 300 dimples on a golf ball. If it takes him 2 seconds to paint one dimple, how many minutes will he need to do his job? A. 4 B. 6 C. 8 D. 10 E. 12	2. I'm thinking of two whole numbers. Their product is 24 and their sum is 11. What is the larger number? A. 3 B. 4 C. 6 D. 8 E. 12
3. Granny Smith has \$63. Elberta has \$2 more than Anjou and Anjou has one-third as much as Granny Smith. How many dollars does Elberta have? A. 17 B. 18 C. 19 D. 21 E. 23	4. The digits 1, 2, 3, 4, and 9 are each used once to form the smallest possible even five-digit number. The digit in the tens place is A. 1 B. 2 C. 3 D. 4 E. 9
5. On a dark and stormy night Snoopy saw a flash of lightning. Ten seconds later he heard thunder. The speed of sound is 1088 feet per second and one mile is 5280 feet. Estimate, to the nearest half-mile, how far Snoopy was from the lightning. A. 1 B. 1 1/2 C. 2 D. 2 1/2 E. 3	6. Six trees are equally spaced along one side of a straight road. The distance from the first tree to the fourth is 60 feet. What is the distance in feet between the first and last trees? A. 90 B. 100 C. 105 D. 120 E. 140
7. The small kite (drawn on a 1-inch grid) has diagonals 6 and 7 units. What is the number of square inches in the area of the small kite? A. 21 B. 22 C. 23 D. 24 E. 25 	8. The large kite is made by tripling both the height and width of the small kite's grid. Genevieve puts bracing on the large kite in the form of a cross connecting opposite corners. How many inches of bracing material does she need? A. 30 B. 32 C. 35 D. 38 E. 39 
9. The large kite is covered with gold foil cut from a rectangle that just covers the entire (tripled) grid. How many square inches of waste material are cut off from the four corners? A. 63 B. 72 C. 180 D. 189 E. 264 	10. A collector offers to buy state quarters for 2000% of their face value. At that rate how much will Bryden get for his four state quarters? A. \$20 B. \$50 C. \$200 D. \$500 E. \$2000

11. Points A(3,2), B(3,-2), C(-3,-2), and D(-3,0). What is the area of quadrilateral ABCD? A. 12 B. 15 C. 18 D. 21 E. 24	12. If $a \otimes b = (a + b) / (a - b)$, then $(6 \otimes 4) \otimes 3 =$ A. 4 B. 13 C. 15 D. 30 E. 72
13. Of the 36 students in Richelle's class, 12 prefer chocolate pie, 8 prefer apple, and 6 prefer blueberry. Half of the remaining students prefer cherry pie and half prefer lemon. For Richelle's pie graph, how many degrees should she use for cherry pie? A. 10 B. 20 C. 30 D. 50 E. 72	14. Tyler chooses one meat, two different vegetables, and one dessert (order not important). Meat: beef, chicken, pork Vegetables: baked beans, corn, potatoes, tomatoes Dessert: brownies, chocolate cake, chocolate pudding, ice cream How many different meals might he choose? A. 4 B. 24 C. 72 D. 80 E. 144
15. Homer began peeling a pile of 44 potatoes at 3 per minute. Four minutes later Christen joined him and peeled at 5 per minute. When they finished, how many potatoes had Christen peeled? A. 20 B. 24 C. 32 D. 33 E. 40	16. A square paper, 4 inches per side, is folded in half vertically, then both layers are cut in half parallel to the fold, forming two small rectangles and one large rectangle. What is the ratio of the perimeter of a small rectangle to the perimeter of the large rectangle? A. 1/3 B. 1/2 C. 3/4 D. 4/5 E. 5/6 
17. "Who Wants to Be a Millionaire?" values (K = 1000): Q1=100, Q2=200, Q3=300, Q4=500, Q5=1K, Q6=2K, Q7=4K, Q8=8K, Q9=16K, Q10=32K, Q11=64K, Q12=125K, Q13=250K, Q14=500K, Q15=1000K. Between which two questions is the percent increase smallest? A. From 1 to 2 B. From 2 to 3 C. From 3 to 4 D. From 11 to 12 E. From 14 to 15	18. Two dice are thrown. What is the probability that the product of the two numbers is a multiple of 5? A. 1/36 B. 1/18 C. 1/6 D. 11/36 E. 1/3
19. Car M traveled at a constant speed for a given distance (dashed line). Car N traveled at twice the speed for the same distance (solid line). Which graph shows Car N's speed-time segment correctly? A.  B.  C.  D.  E. 	20. Kaleana shows her test score to Quay, Marty, and Shana; the others keep theirs hidden. Quay: "At least two of us have the same score." Marty: "I didn't get the lowest score." Shana: "I didn't get the highest score." List the scores from lowest to highest for Marty (M), Quay (Q), and Shana (S). A. S, Q, M B. Q, M, S C. Q, S, M D. M, S, Q E. S, M, Q

21. The mean of five different positive integers is 15 and the median is 18. The maximum possible value of the largest integer is A. 19 B. 24 C. 32 D. 35 E. 40	22. On a 20-question test: correct = 5 points, unanswered = 1 point, incorrect = 0 points. Which score is NOT possible? A. 90 B. 91 C. 92 D. 95 E. 97
23. R, S, T are vertices of an equilateral triangle. X, Y, Z are midpoints of its sides. How many noncongruent triangles can be drawn using any three of these six points as vertices? A. 1 B. 2 C. 3 D. 4 E. 20 	24. Each half of a symmetric figure has 3 red, 5 blue, and 8 white triangles. When folded, 2 red-red pairs and 3 blue-blue pairs coincide, and there are 2 red-white pairs. How many white-white pairs coincide? A. 4 B. 5 C. 6 D. 7 E. 9 
25. There are 24 four-digit numbers using digits 2, 4, 5, 7 exactly once each. Only one of these numbers is a multiple of another one. Which is it? A. 5724 B. 7245 C. 7254 D. 7425 E. 7542	Answer Key: 1. D 2. D 3. E 4. E 5. C 6. B 7. A 8. E 9. D 10. A 11. C 12. A 13. D 14. C 15. A 16. E 17. B 18. D 19. D 20. A 21. D 22. E 23. D 24. B 25. D

AMC 2000

1. Aunt Anna is 42 years old. Caitlin is 5 years younger than Brianna, and Brianna is half as old as Aunt Anna. How old is Caitlin? A. 15 B. 16 C. 17 D. 21 E. 37	2. Which of these numbers is less than its reciprocal? A. -2 B. -1 C. 0 D. 1 E. 2
3. How many whole numbers lie in the interval between $\frac{5}{3}$ and 2π? A. 2 B. 3 C. 4 D. 5 E. infinitely many	4. In 1960 only 5% of the working adults in Carlin City worked at home. By 1970 the "at-home" work force had increased to 8%. In 1980 there were approximately 15% working at home, and in 1990 there were 30%. The graph that best illustrates this is A.  B.  C.  D.  E. 
5. Each principal of Lincoln High School serves exactly one 3-year term. What is the maximum number of principals this school could have during an 8-year period? A. 2 B. 3 C. 4 D. 5 E. 8	6. ABCD is a square. Inside this square three smaller squares are drawn with side lengths as labeled. The area of the shaded L-shaped region is A. 7 B. 10 C. 12.5 D. 14 E. 15 
7. What is the minimum possible product of three different numbers of the set $\{-8, -6, -4, 0, 3, 5, 7\}$? A. -336 B. -280 C. -210 D. -192 E. 0	8. Three dice with faces numbered 1 through 6 are stacked as shown. Seven of the eighteen faces are visible, leaving eleven faces hidden (back, bottom, between). The total number of dots NOT visible in this view is A. 21 B. 22 C. 31 D. 41 E. 53 
9. Three-digit powers of 2 and 5 are used in this "cross-number" puzzle. What is the only possible digit for the outlined square? Across: 2. 2^m Down: 1. 5^n 1. 2. A. 0 B. 2 C. 4 D. 6 E. 8	10. Ara and Shea were once the same height. Since then Shea has grown 20% while Ara has grown half as many inches as Shea. Shea is now 60 inches tall. How tall, in inches, is Ara now? A. 48 B. 51 C. 52 D. 54 E. 55

11. The number 64 has the property that it is divisible by its unit digit. How many whole numbers between 10 and 50 have this property?

- A. 15
- B. 16
- C. 17
- D. 18
- E. 20

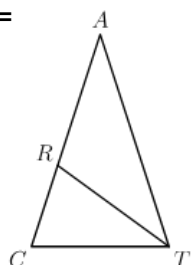
12. A block wall 100 feet long and 7 feet high will be constructed using blocks that are 1 foot high and either 2 feet long or 1 foot long (no blocks may be cut). The vertical joints in the blocks must be staggered as shown, and the wall must be even on the ends. What is the smallest number of blocks needed to build this wall?

- A. 344
- B. 347
- C. 350
- D. 353
- E. 356



13. In triangle CAT, we have $\angle ACT = \angle ATC$ and $\angle CAT = 36^\circ$. If TR bisects $\angle ATC$, then $\angle CRT =$

- A. 16°
- B. 51°
- C. 72°
- D. 90°
- E. 108°

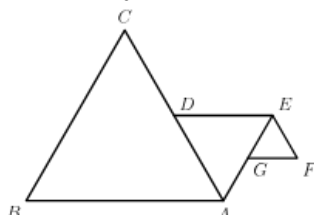


14. What is the units digit of $19^{19} + 99^{99}$?

- A. 0
- B. 1
- C. 2
- D. 8
- E. 9

15. Triangles ABC, ADE, and EFG are all equilateral. Points D and G are midpoints of AC and AE, respectively. If AB = 4, what is the perimeter of figure ABCDEFG?

- A. 12
- B. 13
- C. 15
- D. 18
- E. 21



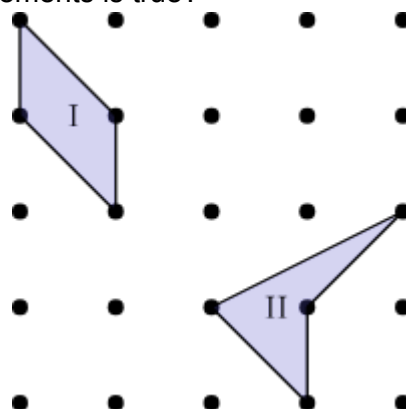
16. In order for Mateen to walk a kilometer (1000 m) in his rectangular backyard, he must walk the length 25 times or walk its perimeter 10 times. What is the area of Mateen's backyard in square meters?

- A. 40
- B. 200
- C. 400
- D. 500
- E. 1000

17. The operation $\otimes$ is defined for all nonzero numbers by $a \otimes b = a^2 / b$. Determine $[(1 \otimes 2) \otimes 3] - [1 \otimes (2 \otimes 3)]$.

- A. $-2/3$
- B. $-1/4$
- C. 0
- D. $1/4$
- E. $2/3$

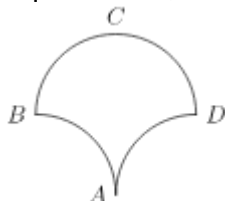
18. Consider these two geoboard quadrilaterals. Which of the following statements is true?



- A. The area of quadrilateral I is more than the area of quadrilateral II.
- B. The area of quadrilateral I is less than the area of quadrilateral II.
- C. The quadrilaterals have the same area and the same perimeter.
- D. The quadrilaterals have the same area, but the perimeter of I is more than the perimeter of II.
- E. The quadrilaterals have the same area, but the perimeter of I is less than the perimeter of II.

19. Three circular arcs of radius 5 units bound the region shown. Arcs AB and AD are quarter-circles, and arc BCD is a semicircle. What is the area, in square units, of the region?

- A. 25
- B. $10 + 5\pi$
- C. 50
- D. $50 + 5\pi$
- E. 25π



20. You have nine coins: a collection of pennies, nickels, dimes, and quarters having a total value of \$1.02, with at least one coin of each type. How many dimes must you have?

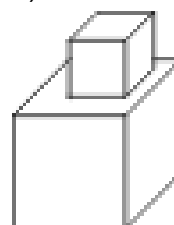
- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

21. Keiko tosses one penny and Ephraim tosses two pennies. The probability that Ephraim gets the same number of heads that Keiko gets is

- A. $1/4$
- B. $3/8$
- C. $1/2$
- D. $2/3$
- E. $3/4$

22. A cube has edge length 2. Suppose that we glue a cube of edge length 1 on top of the big cube so that one of its faces rests entirely on the top face of the larger cube. The percent increase in the surface area (sides, top, and bottom) from the original cube to the new solid formed is closest to

- A. 10
- B. 15
- C. 17
- D. 21
- E. 25

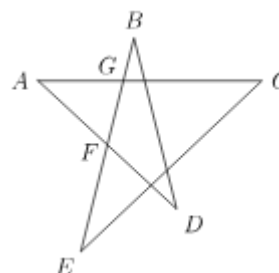


23. There is a list of seven numbers. The average of the first four numbers is 5, and the average of the last four numbers is 8. If the average of all seven numbers is $6 \frac{4}{7}$, then the number common to both sets of four numbers is

- A. $5 \frac{3}{7}$
- B. 6
- C. $6 \frac{4}{7}$
- D. 7
- E. $7 \frac{3}{7}$

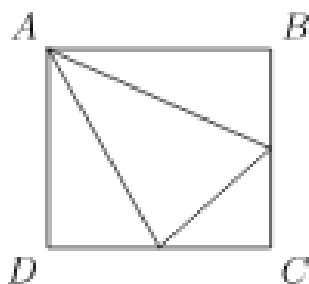
24. If $\angle A = 20^\circ$ and $\angle AFG = \angle AGF$, then $\angle B + \angle D =$

- A. 48°
- B. 60°
- C. 72°
- D. 80°
- E. 90°



25. The area of rectangle ABCD is 72 square units. If point A and the midpoints of BC and CD are joined to form a triangle, the area of that triangle is

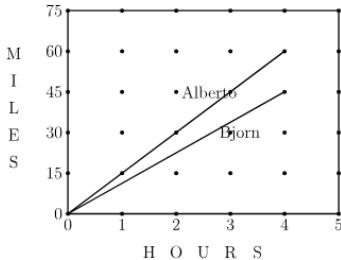
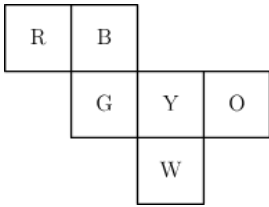
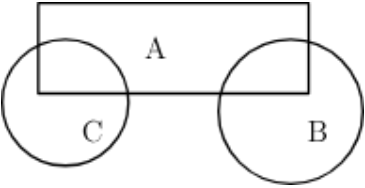
- A. 21
- B. 27
- C. 30
- D. 36
- E. 40



Answer Key:

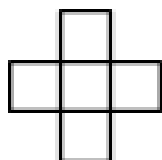
- 1. B
- 2. A
- 3. D
- 4. E
- 5. C
- 6. A
- 7. B
- 8. D
- 9. D
- 10. E
- 11. C
- 12. D
- 13. C
- 14. D
- 15. C
- 16. C
- 17. A
- 18. E
- 19. C
- 20. A
- 21. B
- 22. C
- 23. B
- 24. D
- 25. B

AMC 1999

1. $(6 \ ? \ 3) + 4 - (2 - 1) = 5$. To make this statement true, the question mark between the 6 and the 3 should be replaced by A. / B. * C. + D. - E. None of these	2. What is the degree measure of the smaller angle formed by the hands of a clock at 10 o'clock? A. 30 B. 45 C. 60 D. 75 E. 90
3. Which triplet of numbers has a sum NOT equal to 1? A. $(1/2, 1/3, 1/6)$ B. $(2, -2, 1)$ C. $(0.1, 0.3, 0.6)$ D. $(1.1, -2.1, 1.0)$ E. $(-3/2, -5/2, 5)$	4. The diagram shows the miles traveled by bikers Alberto and Bjorn. After four hours, about how many more miles has Alberto biked than Bjorn? A. 15 B. 20 C. 25 D. 30 E. 35 
5. A rectangular garden 50 feet long and 10 feet wide is enclosed by a fence. Using the same fence, its shape is changed to a square. By how many square feet does this enlarge the garden? A. 100 B. 200 C. 300 D. 400 E. 500	6. Bo, Coe, Flo, Jo, and Moe have different amounts of money. Neither Jo nor Bo has as much as Flo. Both Bo and Coe have more than Moe. Jo has more than Moe, but less than Bo. Who has the least amount of money? A. Bo B. Coe C. Flo D. Jo E. Moe
7. The third exit on a highway is at milepost 40 and the tenth exit is at milepost 160. A service center is located three-fourths of the way from the third exit to the tenth exit. At what milepost is the service center? A. 90 B. 100 C. 110 D. 120 E. 130	8. Six squares are colored (R, B, O, Y, G, W) and hinged, then folded to form a cube. The face opposite the white face is A. B B. G C. O D. R E. Y 
9. Three flower beds overlap. Bed A has 500 plants, B has 450, C has 350. A and B share 50 plants, A and C share 100. The total number of plants is A. 850 B. 1000 C. 1150 D. 1300 E. 1450 	10. A traffic light cycle is 60 seconds: green 25 s, yellow 5 s, red 30 s. At a random time, what is the probability the light is NOT green? A. $1/4$ B. $1/3$ C. $5/12$ D. $1/2$ E. $7/12$

11. Each of 1, 4, 7, 10, 13 is placed in one of five squares so that the sum of the three numbers in the horizontal row equals the sum of the three numbers in the vertical column. The largest possible value for that common sum is

- A. 20
- B. 21
- C. 22
- D. 24
- E. 30



12. The ratio of games won to games lost (no ties) by the Middle School Middies is $11/4$. To the nearest whole percent, what percent of its games did the team lose?

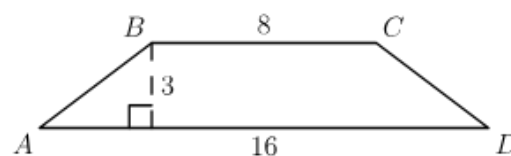
- A. 24%
- B. 27%
- C. 36%
- D. 45%
- E. 73%

13. The average age of the 40 members of a camp is 17 years. There are 20 girls (avg 15), 15 boys (avg 16), and 5 adults. What is the average age of the adults?

- A. 26
- B. 27
- C. 28
- D. 29
- E. 30

14. In trapezoid ABCD, the sides AB and CD are equal. The perimeter of ABCD is

- A. 27
- B. 30
- C. 32
- D. 34
- E. 48



15. Bicycle license plates have three letters: first from {C,H,L,P,R}, second from {A,I,O}, third from {D,M,N,T}. Two new letters are added (both to one set or split across sets). What is the largest possible number of additional license plates that can be made by adding two letters?

- A. 24
- B. 30
- C. 36
- D. 40
- E. 60

16. Tori's test had 75 problems: 10 arithmetic, 30 algebra, 35 geometry. She got 70% of arithmetic, 40% of algebra, 60% of geometry correct, but needed 60% overall to pass. How many more problems did she need correct to reach 60%?

- A. 1
- B. 5
- C. 7
- D. 9
- E. 11

17. (Cookies For a Crowd) 108 students each eat an average of 2 cookies. The recipe makes 15 cookies and uses 2 eggs per recipe. Walter can buy eggs by the half-dozen. How many half-dozen should he buy (some left over allowed)?

- A. 1
- B. 2
- C. 5
- D. 7
- E. 15

18. A big concert reduces attendance by 25%. How many recipes should they make now (still 2 cookies per person, 15 cookies per recipe)?

- A. 6
- B. 8
- C. 9
- D. 10
- E. 11

19. The concert is cancelled. They must make 216 cookies. Each recipe makes 15 cookies and uses 3 tablespoons butter; there are 8 tablespoons per stick. How many sticks of butter are needed (round up)?

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

20. Figure 1 is a "stack map." Figure 2 shows cubes; Figure 3 shows the front view. Which of the following is the front view for the stack map in Figure 4?

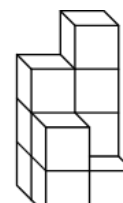
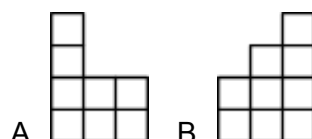


Figure 2

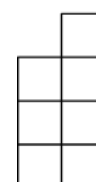
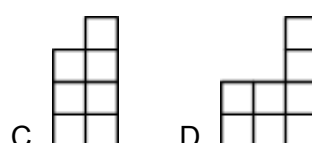
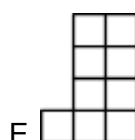


Figure 3

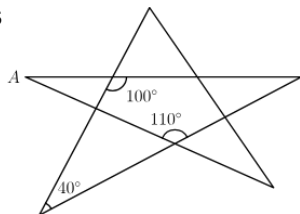


Figure 4



21. The degree measure of angle A is

- A. 20
- B. 30
- C. 35
- D. 40
- E. 45

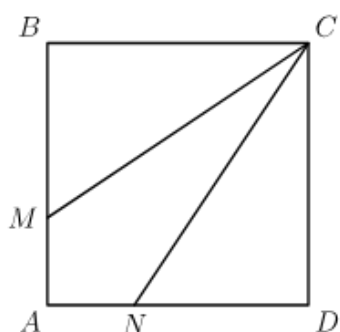


22. In a land, 3 fish = 2 loaves of bread, and 1 loaf = 4 bags of rice. How many bags of rice is one fish worth?

- A. $\frac{3}{8}$
- B. $\frac{1}{2}$
- C. $\frac{3}{4}$
- D. $2\frac{2}{3}$
- E. $3\frac{1}{3}$

23. Square ABCD has side length 3. Segments CM and CN divide the square's area into three equal parts. How long is segment CM?

- A. $\sqrt{10}$
- B. $\sqrt{12}$
- C. $\sqrt{13}$
- D. $\sqrt{14}$
- E. $\sqrt{15}$

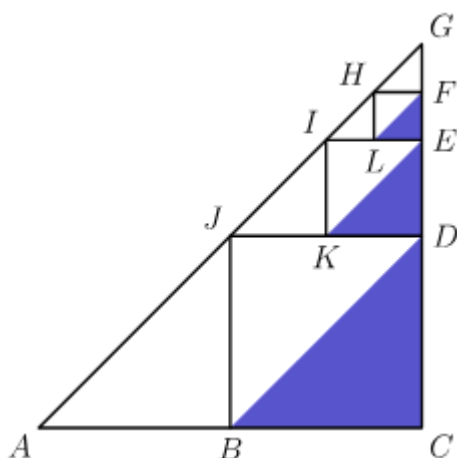


24. When 1999^{2000} is divided by 5, the remainder is

- A. 4
- B. 3
- C. 2
- D. 1
- E. 0

25. In right triangle ACG, points B, D, J are midpoints of sides of ACG. Points K, E, I are midpoints of JDG, etc. If the dividing and shading process is done 100 times (first three shown) and $AC = CG = 6$, the total shaded area is nearest

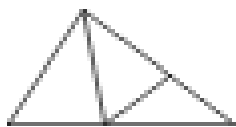
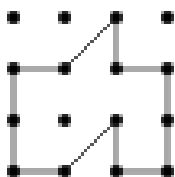
- A. 6
- B. 7
- C. 8
- D. 9
- E. 10



Answer Key:

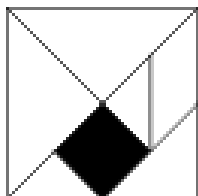
- 1. A
- 2. C
- 3. D
- 4. A
- 5. D
- 6. E
- 7. E
- 8. A
- 9. C
- 10. E
- 11. D
- 12. B
- 13. C
- 14. D
- 15. D
- 16. B
- 17. C
- 18. E
- 19. B
- 20. B
- 21. B
- 22. D
- 23. C
- 24. D
- 25. A

AMC 1998

1. For $x = 7$, which of the following is the smallest? A. $6/x$ B. $6/(x+1)$ C. $6/(x-1)$ D. $x/6$ E. $(x+1)/6$	2. If for a 2×2 matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ the value is $ad - bc$, what is the value for $\begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$? A. -2 B. -1 C. 0 D. 1 E. 2
3. What is the value of: $(3/8 + 7/8) \div (4/5)$? A. 1 B. $25/16$ C. 2 D. $43/20$ E. $47/16$	4. How many triangles are in this figure? (Some triangles may overlap other triangles.)  A. 9 B. 8 C. 7 D. 6 E. 5
5. Which of the following numbers is largest? A. 9.12344 B. $9.123(4 \text{ repeating})$ C. $9.12(34 \text{ repeating})$ D. $9.1(234 \text{ repeating})$ E. $9.(1234 \text{ repeating})$	6. Dots are spaced one unit apart, horizontally and vertically. The number of square units enclosed by the polygon is  A. 5 B. 6 C. 7 D. 8 E. 9
7. $100 \times 19.98 \times 1.998 \times 1000$ equals A. $(1.998)^2$ B. $(19.98)^2$ C. $(199.8)^2$ D. $(1998)^2$ E. $(19980)^2$	8. A child's wading pool contains 200 gallons of water. If water evaporates at the rate of 0.5 gallons per day and no other water is added or removed, how many gallons of water will be in the pool after 30 days? A. 140 B. 170 C. 185 D. 198.5 E. 199.85
9. For a sale, a store owner reduces the price of a \$10 scarf by 20%. Later the price is lowered again, this time by one-half the reduced price. The price is now A. \$2.00 B. \$3.75 C. \$4.00 D. \$4.90 E. \$6.40	10. Each of the letters W, X, Y, Z represents a different integer in the set $\{1, 2, 3, 4\}$, not necessarily in that order. If $(W/X) - (Y/Z) = 1$ and $(X/W) - (Z/Y) = 1$, then the sum $W + Y$ is A. 3 B. 4 C. 5 D. 6 E. 7
11. Harry has 3 sisters and 5 brothers. His sister Harriet has S sisters and B brothers. What is the product $S \times B$? A. 8 B. 10 C. 12 D. 15 E. 18	12. What is the value of the following expression? $2(1 - 1/2) + 3(1 - 1/3) + 4(1 - 1/4) + \dots + 10(1 - 1/10)$ A. 45 B. 49 C. 50 D. 54 E. 55

13. What is the ratio of the area of the shaded square to the area of the large square? (Figure drawn to scale.)

- A. $\frac{1}{6}$
- B. $\frac{1}{7}$
- C. $\frac{1}{8}$
- D. $\frac{1}{12}$
- E. $\frac{1}{16}$



14. At Annville Junior High School, 30% of the students in the Math Club are in the Science Club, and 80% of the students in the Science Club are in the Math Club. There are 15 students in the Science Club. How many students are in the Math Club?

- A. 12
- B. 15
- C. 30
- D. 36
- E. 40

15. The Nisos Isles had population 200 in 1998 and the population triples every 25 years. Queen Irene decrees at least 1.5 square miles per person, and the total area is 24,900 square miles. Estimate the population in 2050.

- A. 600
- B. 800
- C. 1000
- D. 2000
- E. 3000

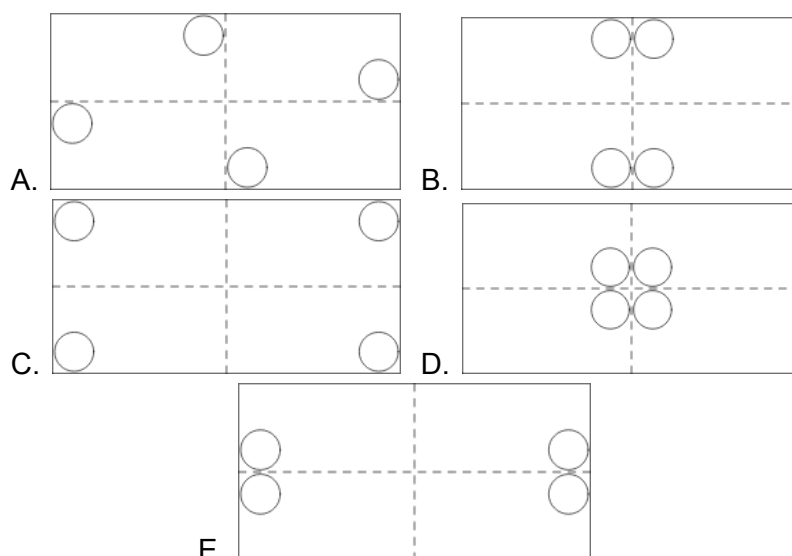
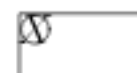
16. Under the same Nisos conditions as #15, estimate the year in which the population will be approximately 6000.

- A. 2050
- B. 2075
- C. 2100
- D. 2125
- E. 2150

17. Under the same Nisos conditions as #15, in how many years (from 1998) will the population be as much as the islands can support?

- A. 50 years
- B. 75 years
- C. 100 years
- D. 125 years
- E. 150 years

18. A rectangular piece of paper is folded bottom to top, then left to right, and finally a hole is punched at X. What does the paper look like when unfolded?

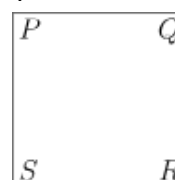


19. Tamika selects two different numbers at random from $\{8,9,10\}$ and adds them. Carlos takes two different numbers at random from $\{3,5,6\}$ and multiplies them. What is the probability that Tamika's result is greater than Carlos' result?

- A. $\frac{4}{9}$
- B. $\frac{5}{9}$
- C. $\frac{1}{2}$
- D. $\frac{1}{3}$
- E. $\frac{2}{3}$

20. Let PQRS be a square piece of paper. P is folded onto R and then Q is folded onto S. The area of the resulting figure is 9 square inches. Find the perimeter of square PQRS.

- A. 9
- B. 16
- C. 18
- D. 24
- E. 36



AI HOMEWORK

WRITTEN BY NYC SPECIALIZED HS ALUMNI #2 SCHOOL IN USA

21. A $4 \times 4 \times 4$ cubical box contains 64 identical small cubes that exactly fill the box. How many of these small cubes touch a side or the bottom of the box?

- A. 48
B. 52
C. 60
D. 64
E. 80

22. Terri produces a sequence of positive integers by the rules:

Rule 1: If the integer is less than 10, multiply it by 9.

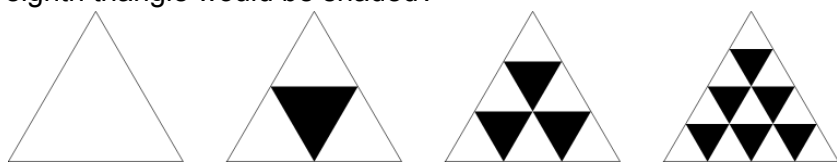
Rule 2: If the integer is even and greater than 9, divide it by 2.

Rule 3: If the integer is odd and greater than 9, subtract 5 from it.

Find the 98th term of the sequence that begins 98, 49, ...

- A. 6
B. 11
C. 22
D. 27
E. 54

23. If the pattern in the diagram continues, what fraction of the eighth triangle would be shaded?



- A. $\frac{3}{8}$
B. $\frac{5}{27}$
C. $\frac{7}{16}$
D. $\frac{9}{16}$
E. $\frac{11}{45}$

24. A rectangular board of 8 columns is numbered left to right: row 1 has 1–8, row 2 has 9–16, and so on. A student shades square 1, then skips one square and shades square 3, skips two squares and shades square 6, skips three squares and shades square 10, and continues this way until there is at least one shaded square in each column. What is the number of the shaded square that first achieves this result?

1	2	3	4	5	6	7	8
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- A. 36
B. 64
C. 78
D. 91
E. 120

[illegible]

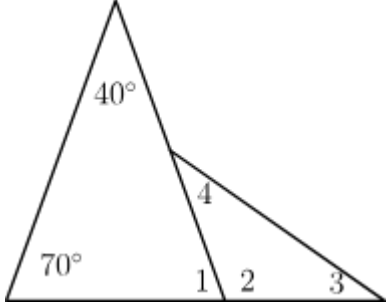
25. Three friends (Amy, Jan, Toy) redistribute money as follows: Amy gives enough money to Jan and Toy to double each amount they have. Jan then gives enough to Amy and Toy to double their amounts. Finally, Toy gives enough to Amy and Jan to double their amounts. If Toy had \$36 at the beginning and \$36 at the end, what is the total amount that all three friends have?

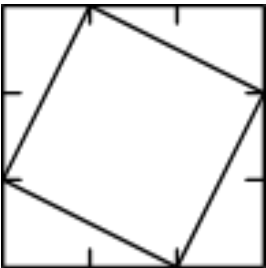
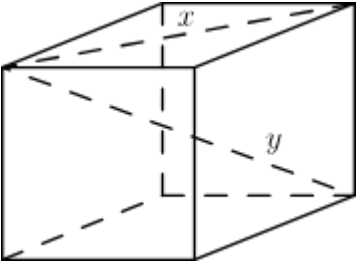
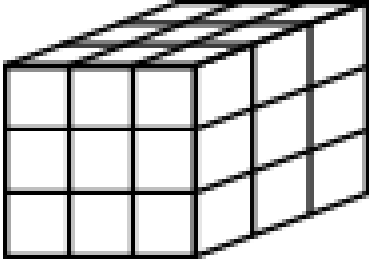
- A. \$108
B. \$180
C. \$216
D. \$252
E. \$288

Answer Key:

1. B
2. E
3. B
4. E
5. B
6. B
7. D
8. C
9. C
10. E
11. C
12. A
13. C
14. E
15. D
16. B
17. C
18. B
19. A
20. D
21. B
22. D
23. C
24. E
25. D

AMC 1997

1. Here you go — cleaned up for Google Docs (plain text, simple fractions/units, no special formatting). I kept exactly five choices per question and put all answers at the end. What is $\frac{1}{10} + \frac{9}{100} + \frac{9}{1000} + \frac{7}{10000}$? A. 0.0026 B. 0.0197 C. 0.1997 D. 0.26 E. 1.997	2. Ahn chooses a two-digit integer, subtracts it from 200, and doubles the result. What is the largest number Ahn can get? A. 200 B. 202 C. 220 D. 380 E. 398
3. Which of the following numbers is the largest? A. 0.97 B. 0.979 C. 0.9709 D. 0.907 E. 0.9089	4. Julie's speech must last between one-half hour and three-quarters of an hour. The ideal rate is 150 words per minute. Which word count is appropriate? A. 2250 B. 3000 C. 4200 D. 4350 E. 5650
5. There are many two-digit multiples of 7, but only two have a digit sum of 10. The sum of these two multiples is A. 119 B. 126 C. 140 D. 175 E. 189	6. In the number 74982.1035, the value of the place occupied by the digit 9 is how many times the value of the place occupied by the digit 3? A. 1,000 B. 10,000 C. 100,000 D. 1,000,000 E. 10,000,000
7. The area of the smallest square that will contain a circle of radius 4 is A. 8 B. 16 C. 32 D. 64 E. 128	8. Walter gets up at 6:30 a.m., catches the school bus at 7:30 a.m., has 6 classes that last 50 minutes each, has 30 minutes for lunch, and has 2 hours additional time at school. He takes the bus home and arrives at 4:00 p.m. How many minutes has he spent on the bus? A. 30 B. 60 C. 75 D. 90 E. 120
9. Three students with different names line up single file. What is the probability they are in alphabetical order from front to back? A. $\frac{1}{12}$ B. $\frac{1}{9}$ C. $\frac{1}{6}$ D. $\frac{1}{3}$ E. $\frac{2}{3}$	10. What fraction of a square region is shaded? Stripes are equal in width, and the figure is drawn to scale.  A. $\frac{5}{12}$ B. $\frac{1}{2}$ C. $\frac{7}{12}$ D. $\frac{2}{3}$ E. $\frac{5}{6}$
11. Let $d(N)$ be the number of positive divisors of N. Find $d(d(11)) \times d(20)$. A. 6 B. 8 C. 12 D. 16 E. 24	12. Angles 1 and 2 are supplementary (sum to 180 degrees). Also, angle 3 equals angle 4. Find the measure of angle 4.  A. 20 degrees B. 25 degrees C. 30 degrees D. 35 degrees E. 40 degrees

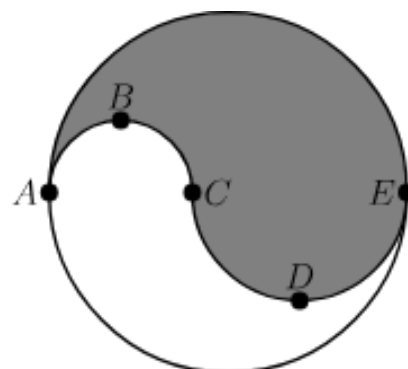
13. Three bags of jelly beans contain 26, 28, and 30 beans. The ratios of yellow to all beans in the bags are 50%, 25%, and 20%, respectively. All three bags are dumped into one bowl. Which is closest to the overall percent of yellow beans? A. 31% B. 32% C. 33% D. 35% E. 95%	14. A set of five positive integers has mean 5, median 5, and only mode 8. What is the difference between the largest and smallest integers? A. 3 B. 5 C. 6 D. 7 E. 8
15. Each side of a large square is trisected. The corners of an inscribed square are at those trisection points. What is (area of inscribed square) : (area of large square)? A. $\frac{3}{5}$ B. $\frac{5}{9}$ C. $\frac{2}{3}$ D. $\frac{5}{3}$ E. $\frac{7}{9}$ 	16. Penni Precisely buys \$100 of stock in each of three companies: AA, BB, and CC. After one year: AA up 20%, BB down 25%, CC unchanged. After the second year: AA down 20% (from its year-1 value), BB up 25% (from its year-1 value), CC unchanged again. If A, B, and C are the final values, which is true? A. $A = B = C$ B. $A = B < C$ C. $C < B = A$ D. $A < B < C$ E. $B < A < C$
17. In a cube, a segment joining two vertices not joined by an edge is called a diagonal (face diagonals and space diagonals). How many diagonals does a cube have in total? A. 6 B. 8 C. 12 D. 14 E. 16 	18. Small tissue boxes were priced 4 for \$5 last week. This week they are on sale 5 for \$4. The percent decrease in price per box during the sale is closest to A. 30% B. 35% C. 40% D. 45% E. 65%
19. If $(\frac{3}{2}) \cdot (\frac{4}{3}) \cdot (\frac{5}{4}) \cdot (\frac{6}{5}) \cdot \dots \cdot (\frac{a}{b}) = 9$, what is $a + b$? A. 11 B. 13 C. 17 D. 35 E. 37	20. A pair of 8-sided dice have faces numbered 1 through 8. Each face is equally likely. The probability that the product of the two numbers exceeds 36 is A. $\frac{5}{32}$ B. $\frac{11}{64}$ C. $\frac{3}{16}$ D. $\frac{1}{4}$ E. $\frac{1}{2}$
21. Each corner cube is removed from a $3 \text{ cm} \times 3 \text{ cm} \times 3 \text{ cm}$ cube. What is the surface area (in square centimeters) of the remaining figure? A. 19 B. 24 C. 30 D. 54 E. 72 	22. A two-inch cube ($2 \times 2 \times 2$) of silver weighs 3 pounds and is worth \$200. How much is a three-inch cube of silver worth? A. \$300 B. \$375 C. \$450 D. \$560 E. \$675

23. Positive integers have these properties: (I) the sum of the squares of their digits is 50; (II) each digit is larger than the one to its left. The product of the digits of the largest integer with both properties is

- A. 7
- B. 25
- C. 36
- D. 48
- E. 60

24. Diameter ACE is divided at C in the ratio 2:3. Semicircles ABC and CDE divide the circle into an upper (shaded) region and a lower region. What is (area of upper) : (area of lower)?

- A. 2:3
- B. 1:1
- C. 3:2
- D. 9:4
- E. 5:2



25. All even numbers from 2 to 98 inclusive, excluding those ending in 0, are multiplied together. What is the units digit of the product?

- A. 0
- B. 2
- C. 4
- D. 6
- E. 8

Answer Key:

- 1. C
- 2. D
- 3. B
- 4. E
- 5. A
- 6. C
- 7. D
- 8. B
- 9. C
- 10. C
- 11. A
- 12. D
- 13. A
- 14. D
- 15. B
- 16. E
- 17. E
- 18. B
- 19. D
- 20. A
- 21. D
- 22. E
- 23. C
- 24. C
- 25. D