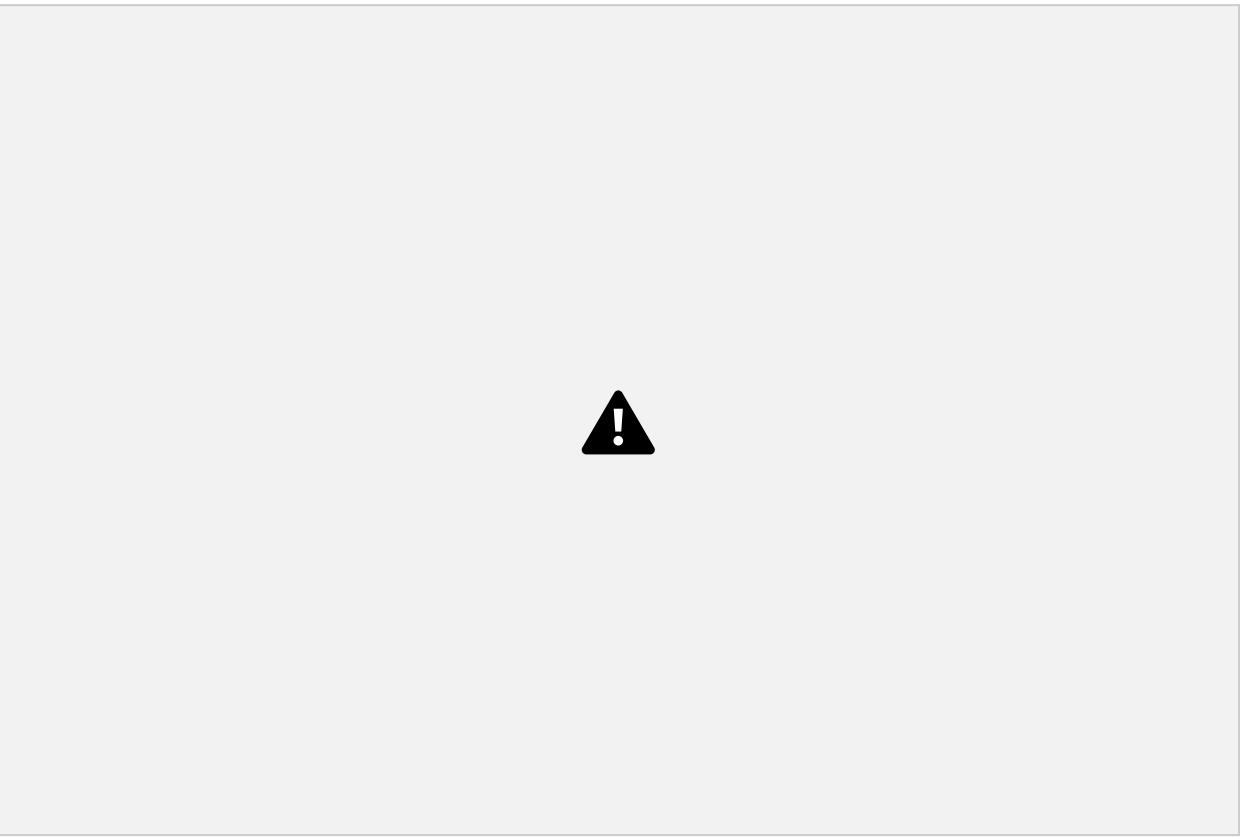
1.



In the figure above, *PQRS* is a parallelogram. What is the value of *x*?

2. Jack eats apples and bananas in a ratio of 2 :5. How many bananas did Jack eat if he ate 20 apples?

3. For what value of *x* is $5x = -6x + 22$?

4. A survey asked the students in a university math course what major they are doing. Based on the results, the following statements are all true.
   a. 51 students are majoring in computer science.
   b. 32 students are majoring in math.
   c. 11 students are majoring in both computer science and math.
   d. 8 students are majoring in neither computer science nor math.

   How many students were surveyed?

5. The sum of two consecutive integers is 7. If 2 is subtracted from the smaller integer and 4 is added to the larger integer, what is the **product** of the two resulting integers?

6. The set of possible values of *s* is {2, 6 ,8 , 11}. What is the set of possible values of *t* if $3t = s - \frac{1}{2}$?

a. $t=\{1, \frac{11}{3}, 5, 7\}$
b. $t=\{\frac{3}{2}, \frac{11}{2}, \frac{15}{2}, \frac{21}{2}\}$
c. $t=\{\frac{9}{4}, \frac{33}{4}, \frac{45}{4}, \frac{63}{4}\}$
d. $t=\{2, 6, 8, 11\}$

7. The perimeter of one park is 400 meters. How many millimeters is the total perimeter in three parks that have the same perimeter as this one?

a. 1,200,000 mm
b. 120,000 mm
c. 12,000 mm
d. 1,200 mm

8. In a certain video game, scores range from 0 to 250. Jane did 3 rounds and her average score was 210. Joe did 5 rounds. If Jane and Joe have the same sum of scores, what was Joe's average? a. 42

b. 126
c. 210
d. 630

9. Sally has three times as many candies as Lily. Sally takes 2 candies from Lily, but she now has 10 more than Lily. How many candies did Sally have to start with?

a. 9
b. 12
c. 15
d. 3

10. In a scale diagram, 0.5 inch represents 50 feet. How many inches represent 1 yard? a. 1.5 in

b. 0.5 in
c. 100 in
d. 0.01 in

11.

Video game consoles per household

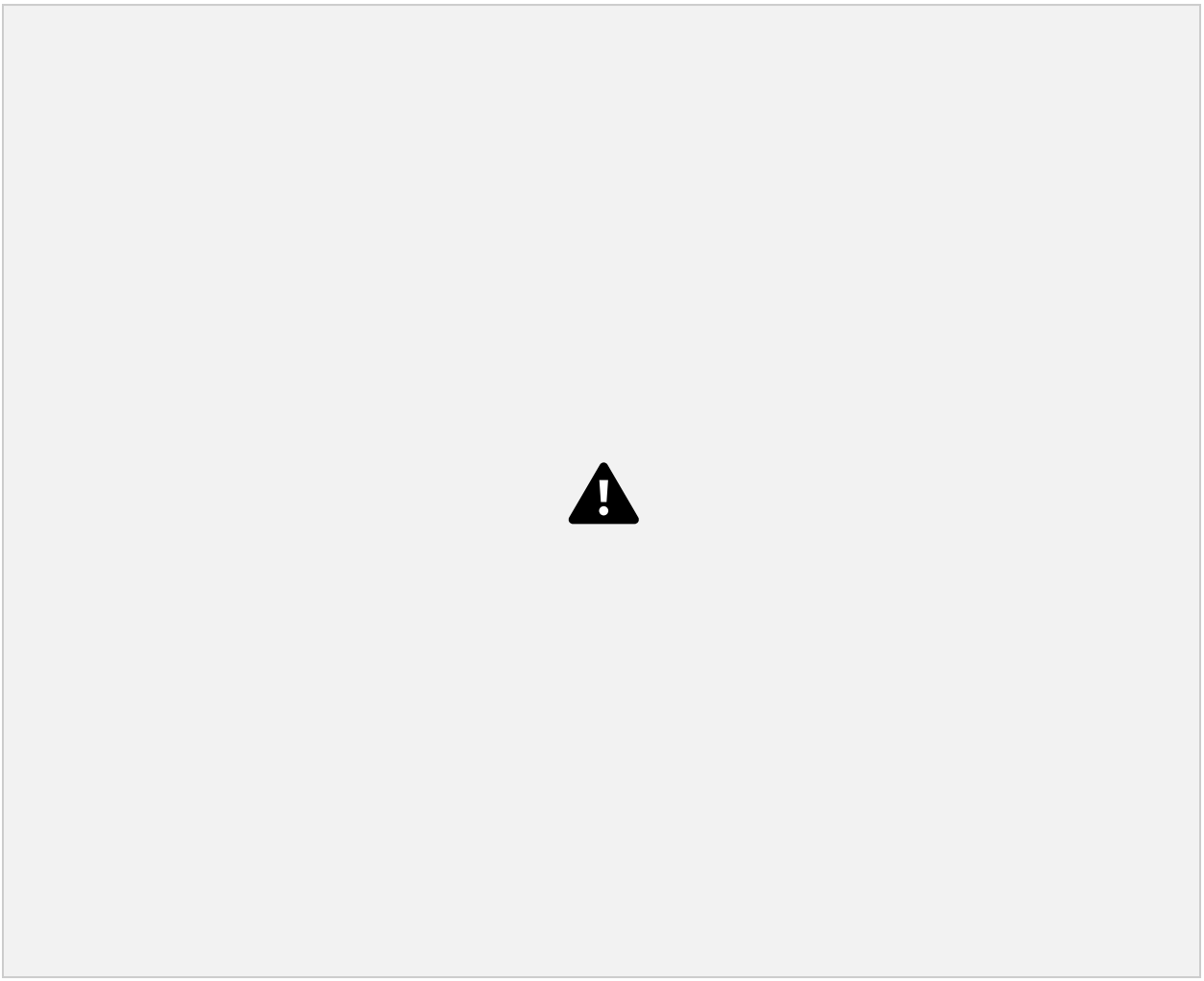
| **Number of video game consoles in household** | **Percent of households** |
|---|---|
| 0 | 2% |
| 1 | 10% |

| | |
|---|---|
| 2 | 43% |
| 3 | 31% |
| 4 or more | 14% |

A researcher noted the number of video game consoles in each household. The table above shows the percent distribution for 300 households. How many of the 300 households contained at least 2 video game consoles?

a. 88
b. 135
c. 36
d. 264

12.

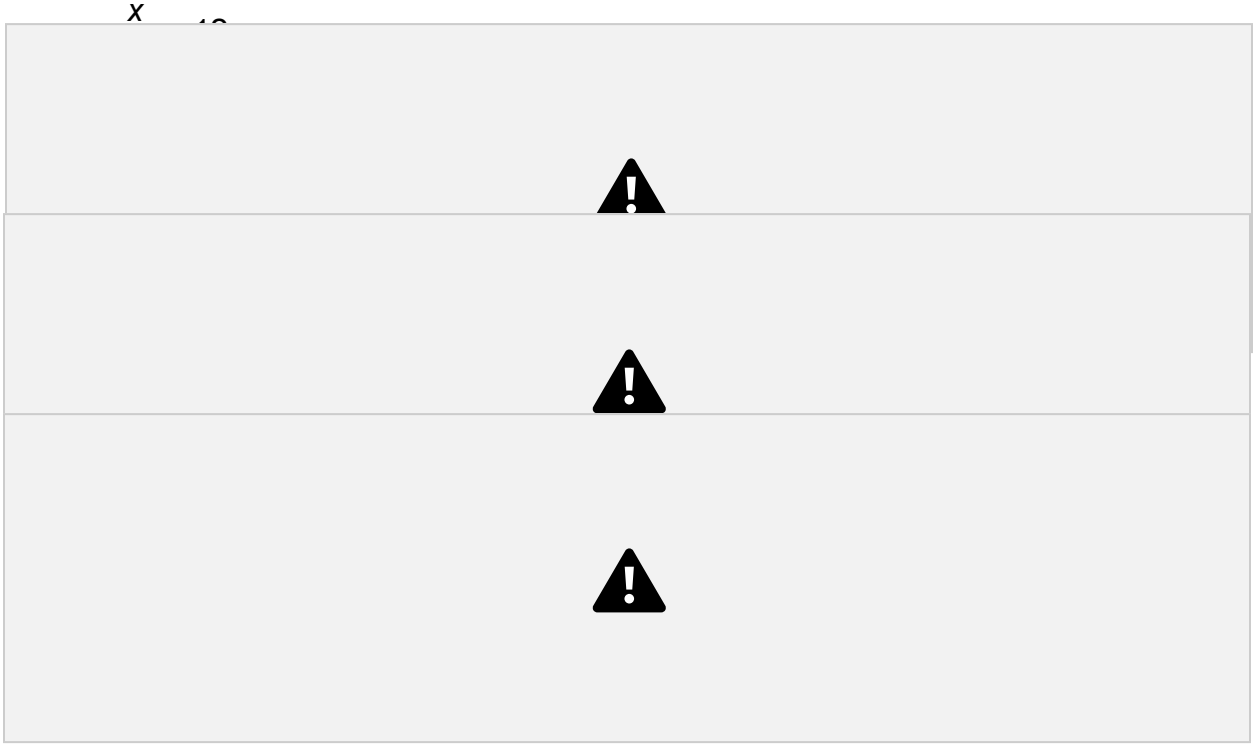


In the pyramid above, each triangular face has the same area, and the base *MNPQ* is a square that measures 5 inches on each side. If the length of $\overline{RS}$=10 inches, what is the surface area of the pyramid excluding the base?

13. The perimeter of a rectangle is 144 inches. The ratio of the length to the width is 5 :4. What are the dimensions of this rectangle?

a. 40 in by 32 in
b. 80 in by 64 in
c. 60 in by 48 in
d. 70 in by 56 in

14. Which number line below shows the solution to the inequality $-6 \leq \frac{x}{3}$



b.

c.

d.

15.

1 dollar ¿0.25 notebooks

1 dollar ¿2 folder

Jill has 35 notebooks and 20 folders. If she exchanges the notebooks and folders for dollars according to the rates above, how many dollars will she receive?

a. *$* 48.75
b. *$* 140
c. *$* 155
d. *$* 150

16. A school bag contains exactly 30 pencils. The probability of choosing a pencil from

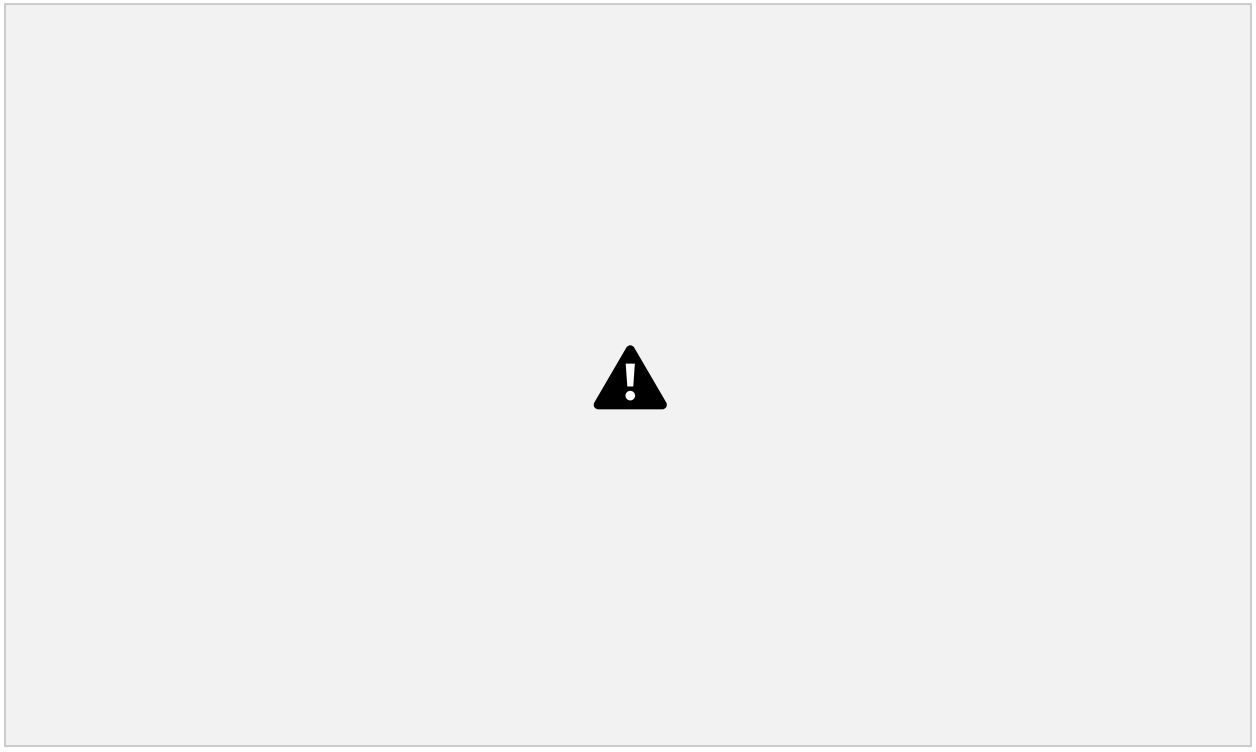
the bag is $\frac{3}{8}$. How many of the objects in the bag are **not** pencils?

a. 50
b. 80
c. 30
d. 11

17. The sum of the numbers *a*, *b*, and *c* is 29. The ratio of *a* to *b* is 2 :3, and the ratio of *b* to *c* is 4 :3. What is the value of *b*?

a. 3
b. 4
c. 6
d. 10

18.



What is the area of the shaded region in the graph above?

a. 4 square units
b. 2 square units
c. 1 square unit
d. 6 square units

19. 60% of the students in a university are male, and 40 % of the students are doing a STEM major. Of the total number of students in the university, 55% are males who are doing a STEM major. What percentage of the total number of students in the university are females who are not doing a STEM major?

a. 7%
b. 33%
c. 12%
d. 40 %

20. Anna bought 7 flowers for *$* 1.30 each and 2 boxes of chocolate. She paid a total of *$* 45.20 for these items, not including tax. What was the price per box of chocolate? a. *$* 27.15
b. *$* 36.1
c. *$* 18.05
d. *$* 22.51

21. In a sample of 11 colored pencils, 7 are green and 4 are yellow. If 2 pencils are selected at random from the sample, one at a time without replacement, what is the probability that both pencils are **not** yellow?
a. $\frac{6}{10}$
b. $\frac{21}{55}$
c. $\frac{42}{121}$
d. $\frac{49}{121}$

22.

1 marble = 2 erasers
1 bottle = 3 marbles
3 erasers = 5 pieces of paper

A nation has a special currency that uses four objects: bottles, marbles, erasers, and paper. The relationship between the four objects is shown above. Which object is most valuable? a. bottles
b. marbles
c. erasers
d. paper

23.

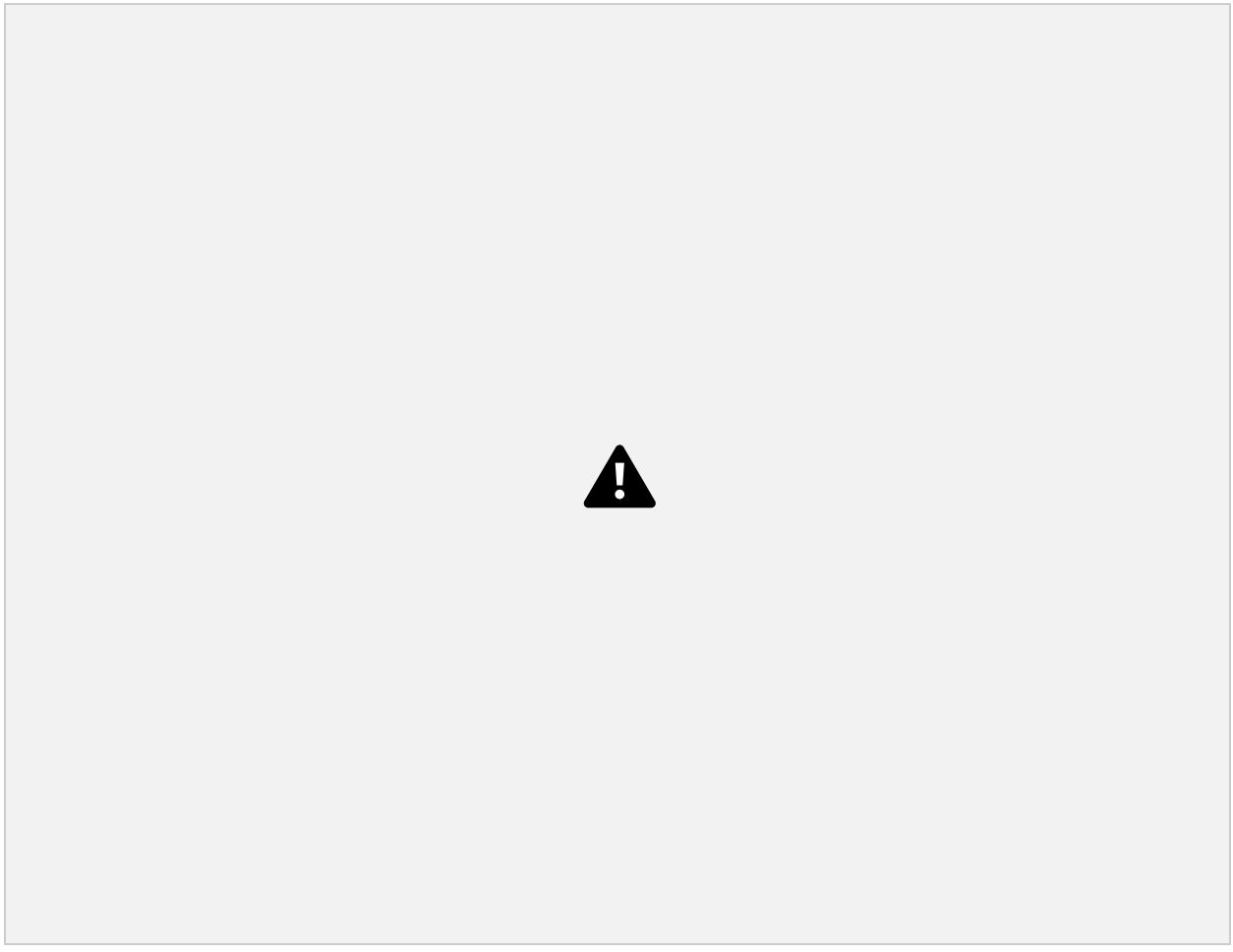
Number of siblings

| Number of siblings | Number of students |
|---|---|
| 0 | 2 |

| | |
|---|---|
| 1 | 7 |
| 2 | 8 |
| 3 | 3 |

What is the mean number of siblings of the 20 students in the table above? a. 7
b. 1.6
c. 4
d. 8

24.



How many more people in the middle school prefer reading than playing video games? a. 88
b. 150
c. 10
d. 25

25. Which of the following numbers has factors that include the smallest factor (other than 1) of 105?

a. 42
b. 10
c. 2
d. 43

26. In a scale drawing of a pizza slice, one side measures 20 centimeters and the other two sides each measure 32 centimeters. On the actual pizza slice, these two sides each measure 8 inches. What is the length of the remaining side of the actual pizza slice?

a. 5 in
b. 4 in
c. 6 in
d. 3 in

27. The faculty of a certain high school consists of 60 teachers. There are 100 freshmen. The student-to-faculty ratio for the entire high school is 12 to 1. What is the total number of sophomores, juniors, and seniors?

a. 400
b. 1,200
c. 720
d. 620

28.

$$6^{2}\ 3+4^{4}\ 5-5^{1}{}_{2}$$

What is the value of the expression shown above?

a. $5^{29}{}_{30}$
b. $6^{29}{}_{30}$
c. $16^{29}{}_{30}$
d. $15^{29}{}_{30}$

29. Ivy is running 63,360 feet per hour, and 1 mile ¿5,280 feet. Which of the following calculations would give Ivy's speed in **miles per minute**?

a. $\dfrac{60 \cdot 5{,}280}{63{,}360}$
b. $\dfrac{63{,}360 \cdot 60}{5{,}280}$

c. $\frac{63{,}360 \cdot 5{,}280}{60}$

d. $\frac{63{,}360}{60 \cdot 5{,}280}$

30. Today, Tyler's age is $\frac{2}{3}$ of Emily's age. In 5 years, Tyler's age will be $\frac{7}{8}$ of Emily's age. How old is Emily today?

a. 2
b. 3
c. 8
d. 7

31. How many positive odd factors of 100 are greater than 10 and less than 30? a. 0
b. 1
c. 2
d. 3

32. The least of 3 consecutive integers is *l*, and the greatest is *g*. What is the value of $\frac{5l+2g}{3}$ in terms of *l*?

a. $\frac{7l+4}{3}$

b. $\frac{7l+6}{3}$

c. $7l+4$
d. $2l+4$

33. Sally purchases a phone plan. The one-time activation fee of her phone plan is *$* 30, and she will pay an additional *$* 25 per month for the full two years. At the end of the two years, what is the total amount Sally paid for her phone plan?

a. *$* 330
b. *$* 300
c. *$* 630
d. *$* 600

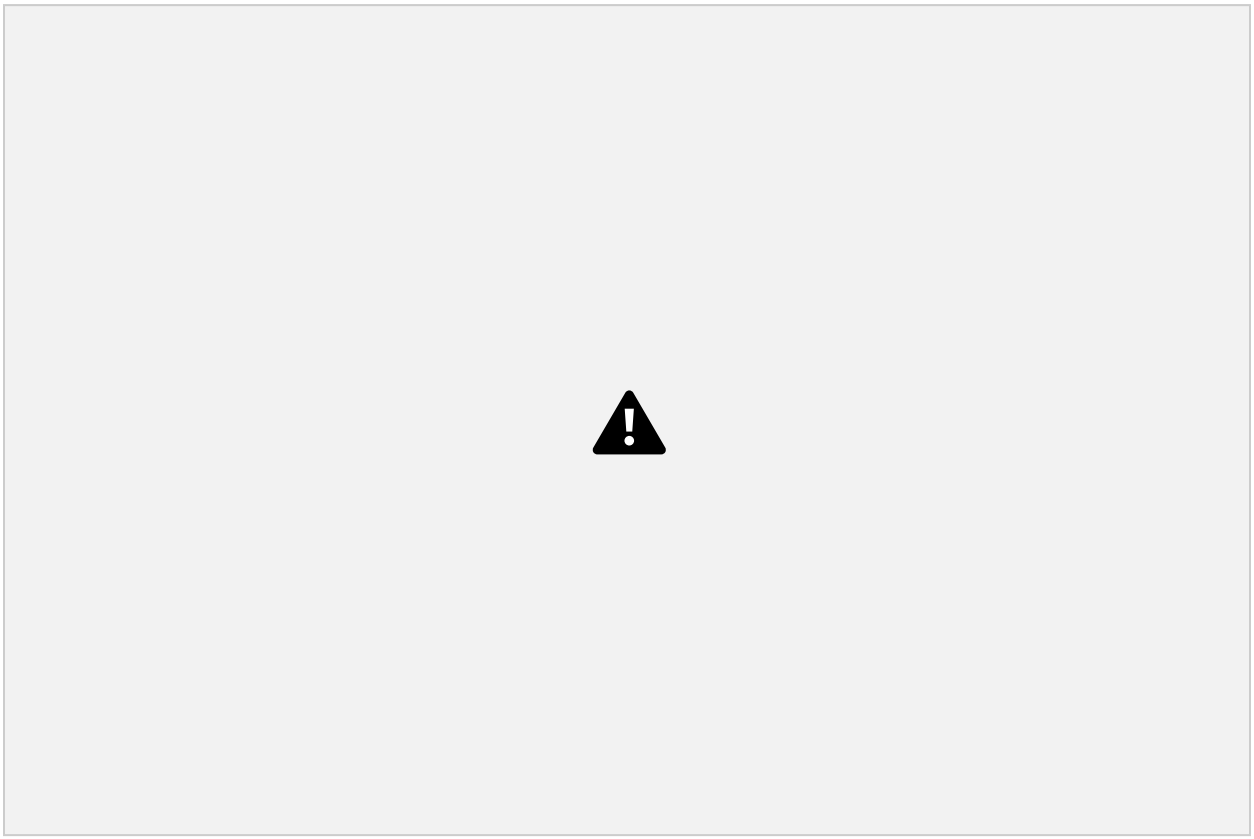
34. There are 4 different tokens in a bucket. Polly will choose 3 of these tokens for a game. How many different combinations of 3 tokens can she choose from the 4?

a. 12
b. 4
c. 24
d. 3

35. Skylar can walk 7 miles per hour, and Nina can walk 10 miles in two hours. What is the total number of miles the two of them can walk in three hours?

a. 21
b. 15
c. 17
d. 36

36.



On the number line above, $AB = \frac{3}{5}$. Point *C* (not shown) is located between point *A* and point *B*. Which value below is a possible value for *C*?

a. 3.25
b. 5.95
c. 3
d. 4

37. An unmarked straight stick will be laid end over end to measure a distance of exactly 20 feet. The same stick will be used in the same way to measure a distance of exactly 16 feet. What is the length of the longest possible stick that can be used for both measurements? a. 2
b. 4

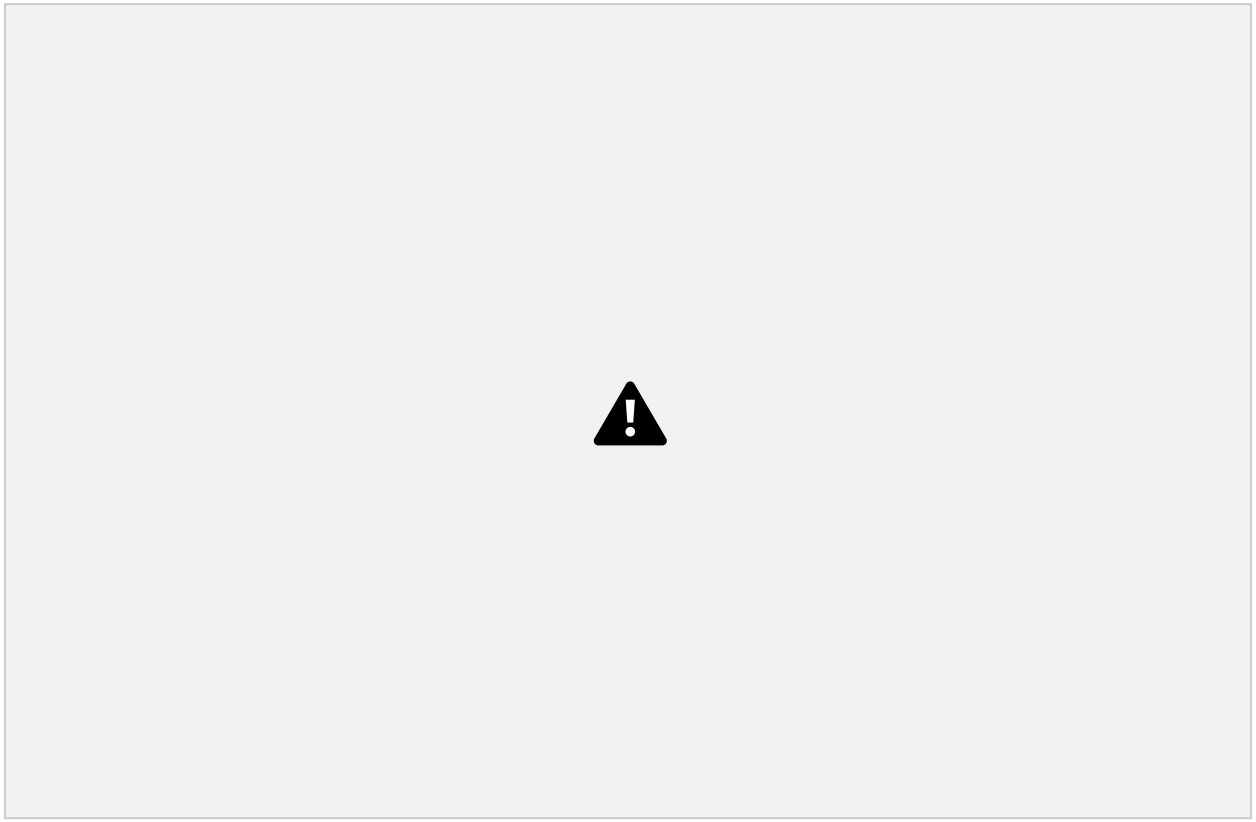
c. 5
d. 20

38. Sandy must do 30 math problems for school this break. It took her 2 hours to do the first 10 problems. At this rate, how much **additional** time will it take her to finish the problems? a. 4
b. 2
c. 6
d. 3

39. Suppose $X=\frac{a}{b}$, $Y=\frac{c}{d}$, and $a$, $b$, $c$, and $d$ do not equal 0. What is $\frac{X}{Y}$ in terms of $a$, $b$, $c$, and $d$ ?
a. $\frac{ac}{bd}$
b. $\frac{bc}{ad}$
c. $\frac{bd}{ac}$
d. $\frac{ad}{bc}$

40. In the set of consecutive integers from 5 to 20, inclusive, there are two integers that are multiples of both 5 and 2. How many integers in this set are multiples of **neither** 5 nor 2? a. 13
b. 8
c. 6
d. 7

41.



The graph above shows the number of stores per town for four towns. Towns A and B each have 10 retail workers per store. Town C has 7 retail workers per store. Town D has 15 retail workers per store. Which of the four towns has the greatest number of retail workers?

a. Town A
b. Town B
c. Town C
d. Town D

42. A box of crayons contains 3 red crayons, 5 blue crayons, and 4 yellow crayons. If Alice selects 2 crayons at random from this box, without replacement, what is the probability that both crayons are not blue?

a. $\frac{42}{144}$
b. $\frac{7}{22}$
c. $\frac{49}{132}$
d. $\frac{49}{144}$

43.

$$b = \frac{a}{\frac{c}{d}}$$

In the equation above, *a*, *b*, *c*, and *d* are positive numbers. Which of these is equal to *b*?

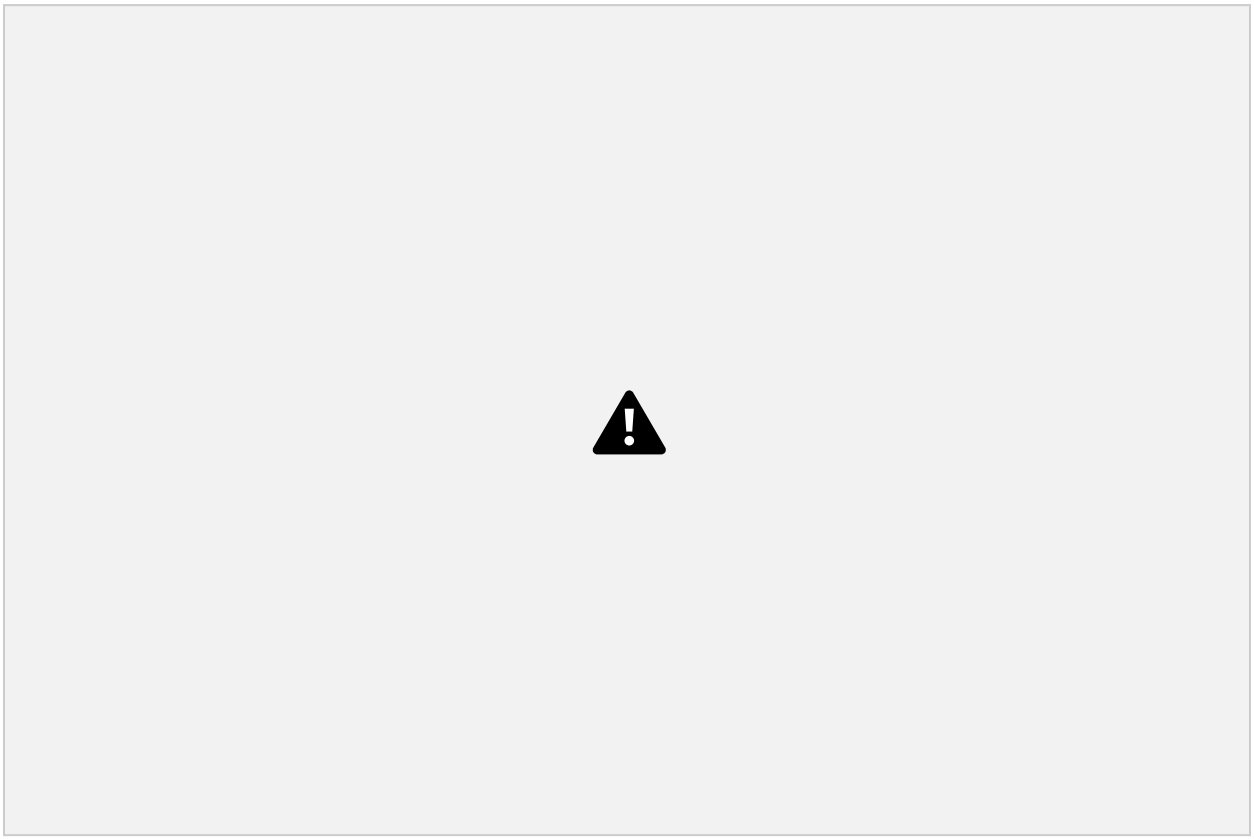
a. $b = \frac{c}{ad}$

b. $b = \frac{ad}{c}$

c. $b = \frac{cd}{a}$

d. $b = \frac{a}{cd}$

44.



On the number line above, points *A*, *B*, *C*, and *D* are integers, and *AB*:*BC*:*CD*=2:3:5. What is the value of *AC*?

a. 8

b. $\frac{1}{2}$

c. 1

d. 4

45. A plastic piece used in an object must have a thickness of 0.5 centimeter, with an allowable error of 2 percent. What is the greatest allowable thickness of the plastic piece?

a. 0.51 centimeter

b. 0.501 centimeter

c. 0.6 centimeter

d. 0.5001 centimeter

46.

| Section | Lowest height | Range |
|---|---|---|
| I | 59 | 10 |
| II | 60 | 12 |
| III | 58 | 9 |
| IV | 62 | 9 |

A study divides a group of women into four sections and records the heights of these women, in inches. The table above shows both the lowest height and the range of heights for each group. What is the overall range of all heights in all four groups?

a. 14
b. 9
c. 10
d. 12

47. If 5 *k* is a positive odd number, how many **even** numbers are in the range from 5 *k* up to and including 5 *k*+6?

a. 1
b. 2
c. 3
d. 4

48.

$$\frac{9}{7} = 0.\overline{285714286}$$

In the infinitely repeating decimal above, 2 is the first digit in the repeating pattern. What is the 402nd digit?

a. 4
b. 2
c. 5
d. 8

49. A truck travels at 264,000 feet per hour. The radius of each tire on the truck is 1.5 feet. How many revolutions does one of these tires make in 1 hour? (Use the

approximation $\frac{22}{7}$ for $\pi$.) a. 1659429

b. 42,000

c. 84,000

d. 829714

50. 50 ¿

a. 110

b. 1,300

c. 462

d. 1588.4

51. A box has candies: 10 pink, 5 purple, and 12 blue. If one candy is picked from the box at random, what is the probability that it will be pink?

a. $\frac{12}{27}$

b. $\frac{10}{27}$

c. $\frac{5}{27}$

d. $\frac{27}{10}$

52. Each week, Allie has fixed expenses of $ 1,300 at her jewelry store. It costs her $ 400 to make a necklace in her shop, and she sells each necklace for $ 620. What is Allie's profit if she makes and sells 10 necklaces in 1 week?

a. $ 900

b. $ 2,200

c. $ 6,200

d. $ 4,900

53. Using the approximation 2.54 centimeters ¿1 inch, how many centimeters are in 5 feet 1 inches?

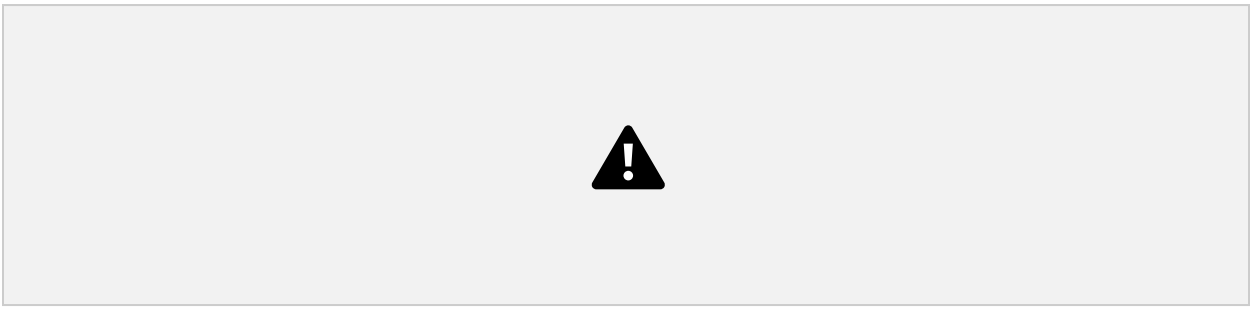
a. 12.7 cm

b. 152.4 cm

c. 154.94 cm

d. 183 cm

54.



On the number line above, $AB=5\frac{1}{4}$, $AD=10\frac{2}{3}$, and $CD=3\frac{5}{6}$. What is the position of point $C$? a. $-4\frac{9}{20}$

b. $2\frac{23}{60}$

c. $6\frac{13}{60}$

d. $3\frac{5}{6}$

55. If $-5x+2y=34$, what is $x$ in terms of $y$?

a. $x=\frac{-5}{2}y+\frac{5}{34}$

b. $x=\frac{5}{2}y-\frac{5}{34}$

c. $x=\frac{-2}{5}y+\frac{34}{5}$

d. $x=\frac{2}{5}y-\frac{34}{5}$

56.

Clubs college students are in

| Number of clubs | Number of students |
|---|---|
| 0 | 9 |
| 1 | 15 |
| 2 | 14 |
| 3 | 12 |

50 college students responded to a survey. The frequency table above shows the number of students who are in 0, 1, 2, or 3 clubs. What is the mean number of clubs per student? a. $1\frac{29}{50}$

b. 1

c. 2

d. $1\frac{1}{2}$

57. A cake is made by mixing the following ingredients by weight: 2 parts flour, 5 parts milk, 4 parts sugar, and 3 parts eggs. One billboard requires 15 cakes. How many total pounds of sugar are required for 7 billboards?

a. 4.3 lb
b. 30 lb
c. 2 lb
d. 25 lb