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Mathematical Olympiads for Elementary and Middle Schools

PROBLEM OF THE WEEK
2026–2027

SOLUTIONS

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11/9/26



Strategy: Do one thing at a time.
The CD costs 20 - 6 = $14 and the bracelet costs 15 - 3 = $12, so Kelly spent 14 + 12 = $26. Then $26 spent plus $28 remaining = $54 to start.

Kelly had $54 before buying the CD and the bracelet

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11/3/26

Billy	Trini	Jason	Kimberly
100	101	103	107
82	83	85	89
29	30	32	36

Differences
107 – 101 = 6
89 – 83 = 6
36 – 30 = 6

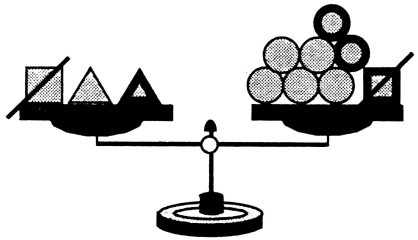
Strategy: Make a table and look for a pattern.
Assume random samples for Billy's age (say, 100 months, 82 months, and 29 months) and compute the differences between Kimberly's and Trini's ages. For example: [View tables to left]

Kimberly is 6 months older than Trini.

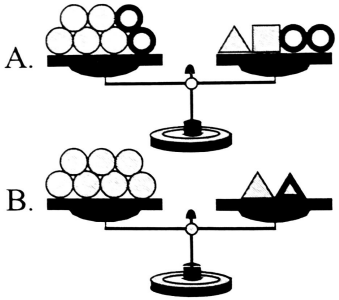
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10/26/26

METHOD ONE:



METHOD TWO:



METHOD ONE:
Strategy: Combine the contents of the two balance scales.
Reverse the pans of the left balance scale. Then combine the contents of the left pans of the two scales, getting 2 triangles and a square. Combine the contents of the two right pans, getting 7 circles and a square. These resulting pans are in balance. After the square is removed from each pan,

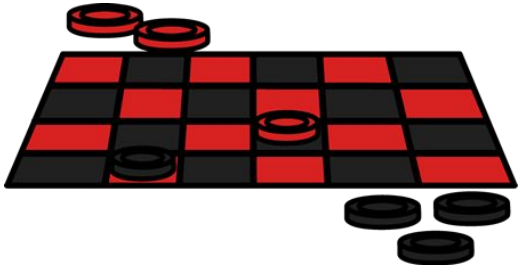
7 circles balance two triangles.

METHOD TWO:
Strategy: Add two circles to each side of the left balance scale.
A. In the left balance scale, the left pan now has 7 circles and the right pan now has one triangle, one square, and two circles.
B. In the question the righthand diagram shows that one square and two circles weigh the same as one triangle. Replace the square and two circles on the right pan in A by one triangle.

7 circles balance two triangles.

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Matches Played	Matches Emily Wins	Matches Jessica Wins
5	4	1
10	8	2
15	12	3

METHOD ONE:
Strategy: Set up a proportion.
Since Jessica won 20% of the matches, Emily won 80% of the matches. Thus the ratio of Jessica's wins to Emily's wins is 1 : 4.

Then 1 : 4 = ? : 12, so Jessica won 3 times.

METHOD TWO:
Strategy: Base a table on the 20% figure.
Since Jessica won 20% of the matches, she won 1 of every 5 matches. Suppose the total number of matches was 5, 10, 15, etc. Then the table shows the number of wins for each girl in each case.

Since Emily had 12 wins, Jessica had 3 wins.

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Strategy: Suppose both people buy the same number of shirts. Suppose Marc makes his purchase 3 times. Then each person buys the same number of shirts and we can compare the amounts spent on caps:

Marc's 3 purchases:
3 shirts and 15 caps cost $69.

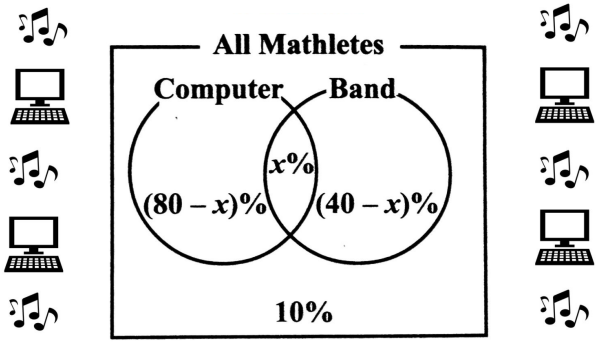
Kathy's 1 purchase:
3 shirts and 2 caps cost $30.

Compare these purchases: Marc buys 13 more caps than Kathy for an extra $39. Thus 1 cap costs $3. Then Kathy bought 2 caps for $6 and had $24 left for 3 shirts.

Therefore, each shirt costs $8.

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Strategy: Use a Venn Diagram.
Since 10% neither own computers nor are in band, 90% either own computers, are in band, or both. However, the sum of 80% and 40% is 120%, but only 90% are in at least one category. Therefore, 30% must have been counted twice.

Thus, 30% of all the mathletes both own computers and are in band.

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Strategy: Consider the deviations from the average.
Suppose the only students in the class are Amanda, Barb, and Colin. The sum of Amanda's and Barb's score is 3 points more than the sum would be if each earned the average score. Colin's score, 82, is therefor 3 points less than the average score.

The class average is 85.

OR

Strategy: Use algebra. Let A be the class average. Then A − 5 = Amanda's score and A + 8 = Barb's score.

$$\frac{(A - 5) + (A + 8) + 82}{3} = A$$

Solving A = 85. The class average is 85.

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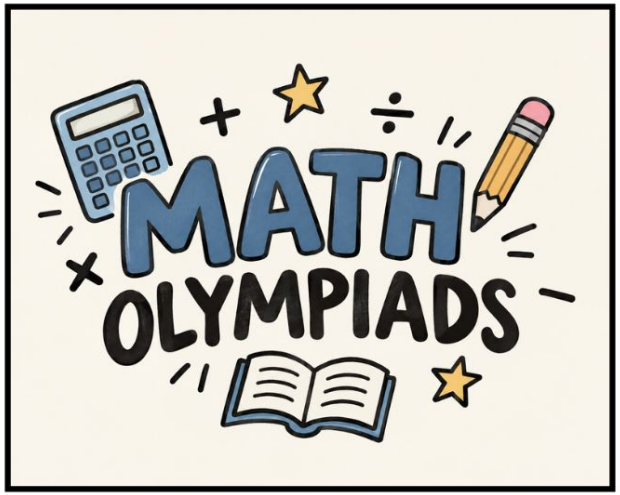


Strategy: Consider the number of teams that include each girl. Designate the five girls as A, B, C, D, and E. Girl A can be teamed with any of the 4 other girls. Likewise, 4 teams include B, 4 teams include C, 4 teams include D, and 4 teams include E. However, this list of 5 × 4 = 20 teams lists each team twice. For example, BC is listed twice, as a team that includes B and as a team that includes C.

Therefore there are 20 ÷ 2 = 10 different doubles teams that can be formed.

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9/14/26



Strategy: Find the length of each cycle, then compute the Least Common Multiple.

The word "MATH" appears every fourth row, beginning with row 1: 1, 5, 9, 13, 17, ...

"OLYMPIADS" appears every ninth row, also beginning with row 1: 1, 10, 19, 28, ...

Using the Least Common Multiple LCM (4,9) = 36, it can be seen that both "MATH" and "OLYMPIADS" appear every 36 rows. In the first row (and only the first row) of each set of 36, both words are spelled correctly. The next correct spelling appears in the first row of the second set. The next correct spelling of "MATH OLYMPIADS" appears in row 37.

So n = 37.

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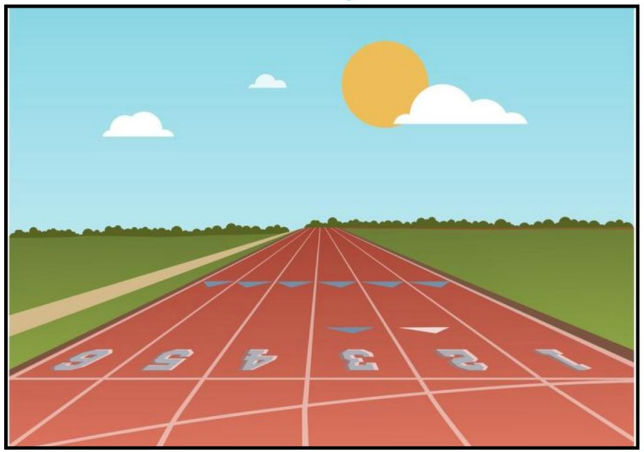


Strategy: Use the reasoning of combinations.
Suppose there are 10 people. Each shakes hands with 9 other people. But every handshake is counted twice because if B is on A's list of handshakes, then A is on B's list. To get the total number of handshakes, multiply 10 by 9 and divide by 2. Applying this to the given problem, we double 15. The 30 we get must equal the product of two consecutive numbers, which are 6 and 5.

6 people are in the room.

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Strategy: Consider the difference of their distances.
Because they start from the same place and run in the same direction, each time Boris and Natasha meet, the difference in the distances they have run must be a whole number of lap lengths around the track. After they start, their first meeting occurs when Boris overtakes Natasha. He will have run 200 meters farther. Each second Boris runs 2 meters farther than Natasha. The elapsed time is 200 ÷ 2 = 100 seconds.

At 3 meters per second, Natasha has run 300m when they first meet after starting.

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Speaker	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Maxie	F	T	T	T	T	F	F
Minnie	T	T	F	F	F	T	T



Strategy: Determine the days on which each could make the statement.
Suppose a "truth teller" says "Tomorrow I will lie." The statement is true. Suppose a liar says "Tomorrow I will lie." This statement is false, so tomorrow the speaker will tell the truth. In either case, the speaker's "truth status" is different today from what it will be tomorrow. The chart below gives the "truth status" for each speaker on each day of the week. The only two consecutive days in which the truth status changes for both speakers is from Thursday to Friday.

The day on which both could say "Tomorrow I will lie" is Thursday.

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8/17/26



Strategy: Convert the percent into a ratio.
A 20% increase means that for every 5¢ that a candy bar used to cost, it now costs 6¢. This cost is 6/5 of what it had been. The same amount of money now buys 5/6 as many candy bars as before.

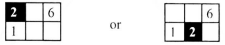
Because 5/6 of 42 is 35, the same amount of money can now buy 35 candy bars.

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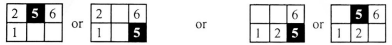
8/10/26



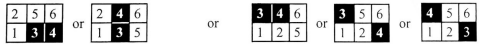
2 can be in either row but must be at the far left of the available spaces.



5 can be in either row but must be at the far right of the available spaces.



3 and 4 go in the remaining spaces. If they are in the same row, 3 goes to the left. If one is directly behind the other, 3 goes in front. Otherwise, 3 and 4 may go in either available space.



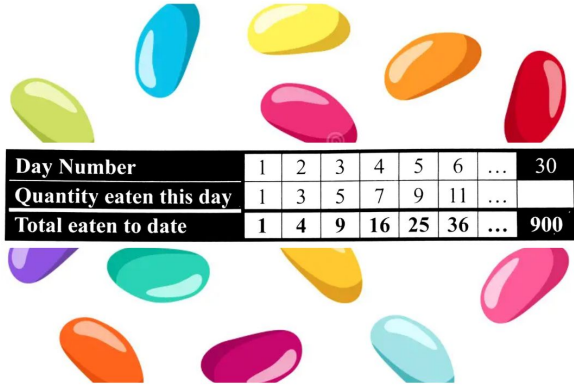
Strategy: List the arrangements systematically.
Denote the 6 girls, from shortest to tallest, by 1, 2, 3, 4, 5, and 6. Position the girls, working from both ends of the list. 1 must be in the front row at the far left. 6 must be in the back row at the far right.

In all, 5 arrangements are possible.

Volume 3, Set 15, Olympiad 1, 1E. 6 Minutes

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8/3/26



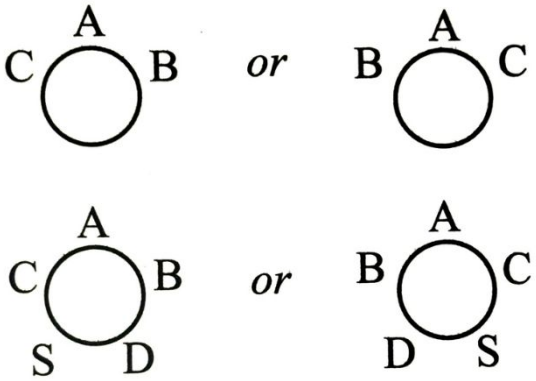
Day Number	1	2	3	4	5	6	…	30
Quantity eaten this day	1	3	5	7	9	11	…	
Total eaten to date	**1**	**4**	**9**	**16**	**25**	**36**	**…**	**900**

Strategy: Start with the first few days; look for a pattern.
The total Lou eats for the first N days is N^2. September has 30 days,

so Lou eats 900 jelly beans in September.

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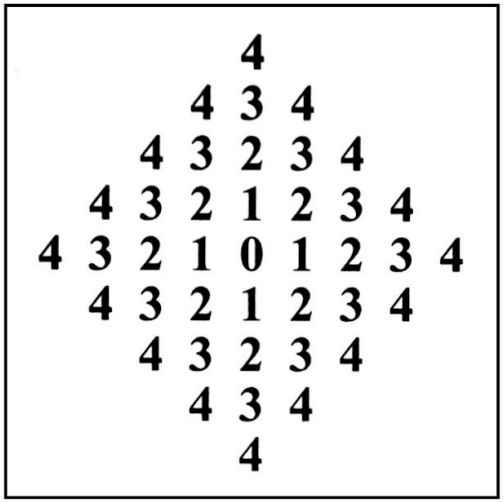


Strategy: First determine the order in which the students sit.
Abby sits next to both Ben and Colin in either order. Dalia sits next to both Ben and Sara in either order. Thus Abby and Colin are seated next to each other. Because the chair numbers are in numerical order and theirs add up to 6, Abby and Colin are seated in chairs 1 and 5, whether counted clockwise or counterclockwise.

In both cases, Dalia is in chair number 3.

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Strategy: Count how many times each digit appears.
There are sixteen 4s, twelve 3s, eight 2s, four 1s, and one 0.

The sum of the digits is (16x4) + (12x3) + (8x2) + (4x1) = 64 + 36 + 16 + 4 = 120.

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7/6/26



Strategy: Find the ones digit first.
Ashley's locker number ends in 0 or 5. It cannot be 0 because then the hundreds digit and the tens digit would be the same. The only other choice for the ones digit is 5. Since the tens digit is 5 more than the hundreds digit, her locker number is one of the following: 165, 275, 385, 495. Of these numbers, only for 385 is the sum of the digits equal to 16.

Ashley's locker number is 385.