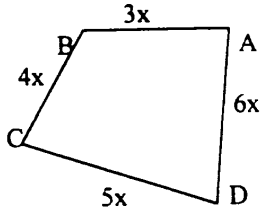
1. The positive difference between ten times a positive number and one-half of the same positive number is 57. Find the positive number.

2. Solve for x: $\frac{35.342}{2x-6} = 4.1$. Express your answer as an exact decimal.

3. After traveling 84 miles, Harriet found that she had gone $\frac{12}{17}$ of the entire distance to her home. Find the number of miles Harriet still needs to travel in order to arrive at her home.

4. Assume that a triangle is a closed figure in a plane (flat surface) bounded by 3 straight sides. Assume that a quadrilateral is a closed figure in a plane (flat surface) bounded by 4 straight sides. Assume that the perimeter of a quadrilateral is the sum of the lengths of its sides. In the figure below, ABCD is a quadrilateral with sides of respective lengths of 3x, 4x, 5x, and 6x as shown on the diagram and with a perimeter of 126. Assume that in any triangle, the sum of the lengths of any two sides must always be longer than the length of the third side. If the distance from A straight to C is a positive integer, find the largest possible value for that distance from A to C.



5. Given the equation: $x(x-1)(5x-2)(3x-9)(25x-4) = 0$. If one of the roots of the given equation is selected at random, find the probability that the root will be an integer. Express your answer as a common fraction reduced to lowest terms.

6. The sum of Betty's age and Chip's age is now 60 years. Six years from now, Chip's age will be 2 years more than 4 times Betty's age 4 years ago. Find Chip's present age.

7. If $f(x+9) = 3x + 2k$ and $f(k-2) = 32$, find the value of k.

8. Mrs. Ford traveled 4 hours at one constant rate and 5 hours at another constant rate and went 512 miles. Had she gone 5 hours at the first rate and 4 hours at the second rate, she would have gone 523 miles. Find the number of mph in her faster rate.

9. At a game, candy bars were sold at 25 cents, 50 cents, and 80 cents each. The number sold at 50 cents was 10 more than the number sold at 80 cents, and the number sold at 25 cents equalled the sum of the numbers sold at the other two prices. If the total revenue from the sale of these candy bars was \$16.50, find the number of candy bars that were sold at 50 cents each.

10. If $x^2 + 3x - (k + 3) = 0$, and the roots for x are equal, find the value of k. Express your answer as an exact decimal.

11. Mr. Orange takes 10 days to complete a job working at a constant rate. After 4 days, Mrs. Blue joins him, and with both working at their normal constant rates, the two complete the job. If Mrs. Blue, working at her normal constant rate, would need 15 days to do the job alone, how many additional days did it take the two to complete the job once Mrs. Blue joined Mr. Orange. Express your answer as an exact decimal.

12. Determine the value of c such that $y - 2$ is a factor of $3y^3 + 2cy^2 + (c - 1)y - 10$. Express your answer as an exact decimal.

13. Let g^{-1} be defined as the inverse function of a one-to-one function g. This means that if (x, y) is a member of g, then (y, x) is a member of g^{-1}. If g is a direct variation defined by $g(x) = kx$, and if $g^{-1}(x) = \frac{3}{5}\, g(x)$, then $g(\frac{24}{7}) = \frac{w\sqrt{p}}{7}$. Find the value of $w + p$ if $w\sqrt{p}$ is in simplest radical form and $w > 0$.

14. If $3.1 < k < 24.1$, and k is an integer, find the sum of all distinct k such that $\sqrt{k}$ is **not** in simplest radical form.

15. If x is an odd integer, find the sum of all distinct x such that $|x - 97| + |x| = 97$.

16. Jerry, working at a constant rate, can do Job P in 120 hours. Karen works at a rate that is 50% more effective than Jerry. If Karen works at her constant rate, find the number of hours it would take Karen alone to do Job P.

17. The line $y = mx + k$ is tangent to (intersects in exactly one place) the curve $y = \frac{12}{x}$ at the point $(p, 3p)$. Solving for p, $p = \frac{48k}{w + k^2}$. Find the value of w.

18. Find the smallest integer greater than 25 which leaves a remainder of 1 when divided by 7 and which leaves a remainder of 2 when divided by 5.

19. Twice the sum of a number and 9 is 30 less than 3 times the number. Find the number.

20. A farmer had at least 1 horse and at least 1 cow on Monday. On Tuesday, the farmer had tripled the number of horses he had on Monday and still had the same number of cows he had on Monday. On Wednesday, the farmer sold 11 of his horses, and the number of cows remained the same as on Monday. On Thursday, there was no change in the number of horses, but the farmer had twice the number of cows that he had on Wednesday. The only change the farmer made on Friday was to add 3 cows. At the end of the day on Friday, the total number of horses and cows the farmer had was 37. How many distinct ordered pairs of the form (number of horses, number of cows) were possible for the horses and cows the farmer had when this problem originally started on Monday?

A

Algebra I

Name S02

School

_____ Correct X 2 pts. ea. = [ ]

School Code

Note: All answers must be written legibly in simplest form, according to the specifications stated in the Contest Manual. Exact answers are to be given unless otherwise specified in the question. No units of measurement are required.

1. 6
2. 7.31 (must be this decimal)
3. 35 (miles optional)
4. 48
5. $\frac{3}{5}$ (must be this reduced common fraction)
6. 44 (years optional)
7. 13
8. 63 (mph. optional)
9. 15
10. −5.25 (must be this decimal)
11. 3.6 (must be this decimal) (days optional)
12. −1.2 (must be this decimal)
13. 23
14. 111
15. 2401
16. 80 (hours optional)
17. 144
18. 57
19. 48
20. 5

ITEM ANALYSIS
149 Papers
Percent of Answers Correct
2A Algebra I

1.	84%	11.	17%
2.	74%	12.	9%
3.	66%	13.	2%
4.	36%	14.	19%
5.	38%	15.	23%
6.	40%	16.	23%
7.	3%	17.	3%
8.	54%	18.	57%
9.	54%	19.	64%
10.	13%	20.	13%

ITEM ANALYSIS
105 Papers
Percent of Answers Correct
1A Algebra I

1.	74%	11.	10%
2.	61%	12.	3%
3.	60%	13.	4%
4.	20%	14.	7%
5.	23%	15.	10%
6.	25%	16.	15%
7.	1%	17.	0%
8.	40%	18.	35%
9.	47%	19.	56%
10.	5%	20.	9%