



Oklahoma School of Science and Mathematics
Fifth Annual Middle School Mathematics Contest
Round One, Spring, 2007

Directions: Write the answer to each question in the box to the right of the question. Use scratch paper provided to do your work. Calculators are allowed, but not necessary. Common fractions should be in simplest form ($\frac{a}{b}$, not mixed numbers).

1. There are 30 students in our class. There are 4 times as many boys as girls. How many girls are there in our class?	1. 6 girls
2. Simplify $\frac{3}{8} + \frac{12}{5} \div \frac{8}{25}$. Write your answer as a common fraction in lowest terms.	2. $\frac{63}{8}$
3. Three siblings, Paul, Peg, and Peter, were born 4 years after each other. The eldest is exactly 5 times as old as the youngest. How old is the middle sibling?	3. 6
4. Points A, B, C, and D lie on a line, in that order. If $AB = 2$, $BC = 5$, and $AD = 14$, what is the ratio of AC to BD? Express your answer as a simplified common fraction.	4. $\frac{7}{12}$
5. Jose bought a shirt for \$12.50, three movies from the "2-for-\$10" rack, and a CD for \$9.00. The tax rate is 8.5%. If he paid for his purchases with 2 \$20 bills, how much change did he receive?	5. \$ <u>0.40</u>
6. If $12 - \sqrt{x} = 9.3$, what is the value of $12 + \sqrt{x}$? Express your answer as a decimal.	6. 14.7
7. A walker needs 12 minutes to go around a square. If she walks at the same rate, how long would it take her to go around a square with an area four times as large?	7. 24 minutes
8. Two successive discounts of 10% and 20% are equivalent to only one discount of x%. What is x?	8. 28
9. If $\frac{a}{b+c} = \frac{a}{b+c}$, what is the value of $\frac{a}{b+c}$?	9. 445
10. How many integers belong to the arithmetic sequence 3, 7, 11, 15, ..., 2007?	10. 502
11. A full bottle of milk weighs 30 oz. but a half-full bottle of milk weighs 18 oz. What is the weight of an empty bottle?	11. 6 oz.
12. What is the smallest number that is a solution for $x^2 + 8x + 12 = 0$?	12. -6
13. In a circle of radius 4 inches, what is the length of the arc cut off by a central angle of 36° ? Give your answer as a reduced common fraction in terms of π .	13. $\frac{4\pi}{5}$ inches
14. How many different line segments can be drawn connecting 6 non-collinear points?	14. 15
15. Two 7 X 7 squares overlap to form a 7 X 11 rectangle, as shown. Find the area of the region in which the two squares overlap. (Figure not drawn to scale.)	15. 21 sq. units
16. If a and b are numbers such that $a + b = 18$, what is the smallest value of $a^2 + b^2$?	16. 162
17. The given figure is made up of two congruent trapezoids with one side perpendicular to the bases. What is the total area of the rectangle formed when the two trapezoids are joined? (Figure not drawn to scale.)	17. 36 sq. units
18. What is the remainder when 2007^{57} is divided by 9?	18. 0
19. How many different four-letter arrangements can be formed using the six letters A, B, C, D, E, and F, if the first letter must be C, one of the other letters in the arrangement must be B, and no letter can be used more than once in an arrangement?	19. 36
20. What is the area of the square with the four vertices at $A(0,0)$, $B(-5,-1)$, $C(-4,-6)$, and $D(1,-5)$?	20. 26 sq. units