

1. Express the following complex fraction as a common fraction: $\frac{2}{5 + \frac{3}{1+4}}$	$\frac{5}{14}$
2. Solve for x $\frac{1}{5 + \frac{1}{5 + \frac{1}{5}}} = \frac{x}{135}$	26
3. Solve for x: $2^3 \cdot 4^3 \cdot 16^{12} = 2^x$	57
4. A fox can eat 2 fish in the same amount of time that a bear can eat 4 fish. Together they ate 30 fish. How many fish did the bear eat?	20 fish
5. On a recent episode of "Who Wants to Be a Mathematician" a contestant was asked to arrange the following numbers in order: 2/3      0.6666      3/5      0.666      0.67 What is the middle number?	0.6666
6. Four notebooks cost as much as five sharpeners. If 10 sharpeners cost \$4, how much do 13 notebooks cost?	\$6.50
7. If $2a + 3b = 7$ , and $b + 1 = 6$ , then $a + 1$ must be equal to what number?	-3
8. Find c if: $a + b + c = 77$ , $a - c = b + c$ and $c = \frac{b}{2}$ .	11
9. If k is between 2 and 3, then which of the following is smallest? k      k-2      k+3      -k      6-k	-k
10. A full tank of oil weighs 30 oz, but a half-full tank of oil weighs 18 oz. What is the weight of the empty tank?	6 oz
11. The three brothers Tom, John, and Steve were born exactly 4 years apart. The eldest is exactly 5 times as old as the youngest. How old is the youngest brother?	2 years or 1 year
12. The average of 5 consecutive integers is 13. One of the integers is removed and the sum of the remaining integers is 53. What is the value of the integer that was removed?	12
13. The point (0, 0) is reflected across the vertical line $x = 1$ . Its image is then reflected across the line $y = 2$ . What are the coordinates of the resulting point?	(2,4)
14. The product of two natural numbers is 378. One of the numbers is 3 smaller than the other. What is the sum of the numbers?	39
15. When the length of a rectangle is increased by 20% and the width is increased by 10%, by what percent is the area of the rectangle increased?	32%
16. Assuming $p > 0$ , what is the positive root of $x^2 - 2px - 8p^2 = 0$ in terms of p.	4p
17. A group of ten persons were planning to chip in equally to buy several pizzas. After the pizzas were ordered, one person left. As a result, each of the remaining nine persons had to pay an extra 60 cents. How much was the total bill?	\$54.00

18. Factor $12x^2 - 26x + 12$	<b>NOTE: Order of factors may change</b>	$2(2x - 3)(3x - 2)$
19. A certain restaurant has exactly 19 tables. Some of these tables are larger tables that can seat six people and the others are smaller tables that can seat just four people. If a total of 90 people can be seated at this restaurant, how many of the tables must be of the larger kind?		7 tables
20. Combine the following into a single expression of the form $a\sqrt{b}$ $\sqrt{6} + \sqrt{54} + \sqrt{150}$		$9\sqrt{6}$
21. How many positive integers strictly between 0 and 2,000 are evenly divisible by each of the integers 4, 6, 10 and 22?		3
22. If a hen and a half can lay an egg and a half in a day and a half, how long will three hens take to lay 12 eggs?		6 days
23. In right triangle <b>JKL</b> , angle <b>KJL</b> measures 60 degrees. When drawn, the angle bisectors of angle <b>JKL</b> and <b>LJK</b> intersect at point <b>M</b> . What is the measure of the obtuse angle <b>JMK</b> ?		135 degrees
24. Simplify $\frac{(x^2 - 9)(7x + 21)}{(x - 3)(x^2 + 6x + 9)}$		7
25. Six students (four juniors and two seniors) must be split into three pairs. If the pairs are chosen randomly, what is the probability that the two seniors form one pair? Express your answer as a common fraction.		$\frac{1}{5}$
26. A rope hangs from the ceiling. It reaches the floor exactly. It is 4 feet from the wall. When it is pulled to the wall, the end of the rope is 4 inches above the floor. How high is the ceiling? Express your answer in inches.		290 inches
27. Two jugs are filled with water. If you remove 1 liter of water from the first jug, then the two jugs contain the same amount of water. If you remove 2 liters from the second, then the second jug would contain half as much as the first. How many liters of water are in the largest jug?		6 liters
28. What is the exact value of $x^2 - 5$ when $x = 2 + \sqrt{5}$ ? (No calculator answers.)		$4(1 + \sqrt{5})$ or $4 + 4\sqrt{5}$
29. The sum of 3 numbers is 975. If you subtract x from each of these numbers you obtain 12, 345 and 126 respectively. What is x?		164
30. If a positive two-digit integer is divided by the sum of its digits, the quotient is 2 with a remainder of 2. What is the two-digit integer?		16
31. Let the function $a @ b$ be defined as $3a + 2b$ for all real numbers a and b. If u and v are real numbers for which $u @ v = v @ u = 20$ , what is the value of $2u @ 3v$ ?		48
<b>Tie Breaker</b>		
On the back page; List all of the prime numbers you can -- In order, from lowest to highest.		

**9<sup>th</sup> Annual  
Oklahoma School of Science and Mathematics  
Middle School Mathematics: An Awesome Contest  
February 26, 2011**



<b>NAME:</b> (Please print) <hr/>	<b>AGE</b>	<b>DATE OF BIRTH</b> mm/dd/yy __ / __ / __	<b>GRADE LEVEL</b>  <b>7 8</b>
<b>Email</b> <hr/>			
<b>SCORE</b> (For official use)  L: _____ R: _____  Total: _____ TB: Y N	<b>GENDER</b> (Circle one)  <b>M F</b>	<b>HOME ADDRESS</b> (Please print) Street _____ City _____ Zip _____ School _____	
<b>Parents' names:</b> (Please print)			

**Directions:** Use the scratch paper provided to do your work. Calculators are allowed, but not necessary. Write the answer(s) to each question in the box to the right of the question. All fractions should be in simplest form (use improper fractions instead of mixed numbers). Round decimal answers to three decimal places. Units are not necessary unless specifically requested in the problem.

This is a 31-question, 1-hour contest. Each question is worth one point. Your score will be the number of correct answers. There is no partial credit or penalty for wrong answers. Please continue working or reworking problems until time is called.

**Do Not Open or Turn Over Until Instructed To Do So**