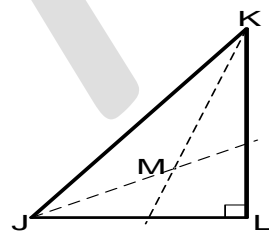


1. If $2^x = 8$ , what is the value of $x^x$ ?	27
2. Express $\left(\frac{25}{9}\right)^{-\frac{3}{2}}$ as a common fraction.	$\frac{27}{125}$
3. A rectangular wall is being covered with 4-inch by 4-inch square tiles. How many tiles are needed to completely cover a wall that is 5 feet by 7 feet?	315 tiles
4. What is the area of a circle whose radius is 0.3 miles? Express your answer in square miles as a multiple of $\pi$ .	$0.09\pi \text{ miles}^2$
5. Robert's average for the first 5 statistics tests was exactly 68. What must he make on the 6 <sup>th</sup> exam to have a 70 average?	80
6. If $\sqrt{k} = \sqrt{2} + \sqrt{2} + \sqrt{2}$ , what is $k$ ?	18
7. If $a! = a(a-1)(a-2)\cdots(2)(1)$ , find the value of $\frac{(n+1)!}{(n-1)!}$ when $n = 100$ .	10,100
8. On a potato farm, 6 people can fill 24 sacks of potatoes in 8 minutes. How many sacks can 7 people fill in 6 minutes?	21 sacks
9. In a warehouse there are 563 kilograms of wheat. After we put an equal amount of wheat in several containers there are 143 kilograms remaining. If we add 5 kilograms more into each container there are 3 kilograms remaining. How much wheat is in each container (including the original amount and the five kilograms)?	20 kilograms
10. Five of the following six expressions are equivalent. Which one is not equivalent to the other five? $c - b + a$ ; $b - (c - a)$ ; $c - (b - a)$ ; $c + a - b$ ; $a - (b - c)$ ; $a - b + c$	$b - (c - a)$
11. Paisano's Pizza Place sells a 6-inch diameter pizza for \$6, an 8-inch diameter pizza for \$8, and a 10-inch diameter pizza for \$10. Which is the best buy?	10 in
12. What is the smallest positive integer greater than 1 which when divided by 2, or 3, or 5, or 6, or 20 has a remainder of 1 in each case?	61
13. The measures of the four interior angles of a quadrilateral $4x$ , $3x + 20$ , $2x + 40$ and $x + 80$ degrees. What is the measure of the smallest interior angle of the quadrilateral?	$84^\circ$
14. Simplify $\left(\frac{3a^2b}{2bc^2}\right)^2 \left(\frac{4b^2c^2}{9ab^2c}\right)^3$	$\frac{16a}{81c}$
15. 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°



16. $k$ is an unknown number between -4 and -5. Arrange the following numbers in increasing order. $-k + 5$ $\frac{k}{2} + 2$ $\frac{k + 2}{2}$	$\text{smallest} = \frac{k+2}{2}$ $\text{middle} = \frac{k}{2} + 2$ $\text{largest} = -k + 5$
17. For the point (4, 2) to be on the graph $y = Ax^2$ what should $A$ be?	$\frac{1}{8}$ or 0.125
18. The perimeter of a rectangle is 22 inches, and the area is 28 square inches. What is the product of the lengths of the diagonals, in square inches?	$65 \text{ in}^2$
19. Given that $72 \leq n \leq 1296$ and $24 \leq d \leq 36$ , what are the largest and smallest values that the expression $\frac{n}{d}$ can possibly have? Write your answers in the form $\text{smallest} \leq \frac{n}{d} \leq \text{largest}$ .	$2 \leq \frac{n}{d} \leq 54$
20. A train is leaving the station in 11 minutes. You are 1 mile from the station. Assuming you can walk at 4 mph and run at 8 mph, how many minutes can you afford to walk before you must begin to run in order to catch the train?	7 minutes
21. $a + b + c = 1,227$ . Determine each integer if $b = 2a$ and $b = c - 12$ .	$a = 243$ $b = 486$ $c = 498$
22. A museum acquires an ancient crown composed of silver and gold. The crown weighs 1.2 kilograms, and its volume is 66 cubic centimeters. If gold weighs 20 grams per cubic centimeter, and silver weighs 10 grams per cubic centimeter, how many grams of gold are in the crown?	1,080 grams
23. The hypotenuse of a right triangle is twice as long as the shortest side, whose length is $m$ . What is the length of the intermediate side, in terms of $m$ ?	$\sqrt{3}m$ or $m\sqrt{3}$
24. Find a quadratic equation of the form $ax^2 + bx + c = 0$ whose solutions are $x = 4 \pm \sqrt{11}$ .	$x^2 - 8x + 5 = 0$
25. Find the smallest integer $n > 1$ so that the units digit of $n^d$ is the same as the units digit of $n$ for all positive integers $d$ .	5
26. If $\overline{abc} + \overline{cba} + \overline{bac} = \overline{2,00a}$ , what are the values for $a$ , $b$ , and $c$ ? Note: $0 \leq a \leq 9$ $0 \leq b \leq 9$ $0 \leq c \leq 9$ Note: $2,000 \leq \overline{2,00a} \leq 2,009$	$a = 7$ $b = 6$ $c = 5$
27. The product of 4 consecutive positive integers is 24,024. What is the first integer in the product?	11
28. A regular polygon has sides of length 3 units and an exterior angle of $24^\circ$ . What is the perimeter of the polygon?	45 units
29. Given $a \Re b = \frac{(a^2 - b^2)}{ab}$ , express $6 \Re 2$ as a common fraction.	$\frac{8}{3}$
30. Find the remainder of the division $3^{2007} \div 15$	12

Turn to the next page for the tie-breaker question

**Tie-Breaker:** Let  $y = \sqrt{x}$ . What is the largest distance from  $x = 4$  that will insure that  $y$  is within  $\frac{1}{10}$  of 2?

Show your work.

Place a box around your answer.

**10<sup>th</sup> Annual**  
**Oklahoma School of Science and Mathematics**  
**Middle School Mathematics: An Awesome Contest**  
**February 25, 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. The 31<sup>st</sup> question is on the last page and it will be used to break ties. You must show your work on the 31<sup>st</sup> question. Each question is worth one point. Your score will be the number of correct answers (excluding the tie-breaker). 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**