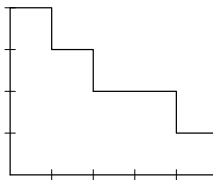# Oklahoma School of Science and Mathematics
Tenth Annual Middle School Mathematics Contest
Round One, Spring 2013

Name: _____

Directions: Write the answer to each question in the box to the right. Units are given in plural form even if the singular form is correct. Use the scratch paper provided to do your work. Calculators are allowed, but not necessary.

Fractions should be in simplest form $\left(\dfrac{3}{2} \ not \ 1\dfrac{1}{2}\right)$.

#	Question		Answer
1.	How many whole numbers are <u>strictly greater than</u> 5 but <u>less than or equal to 20</u>? In other words, how many whole number values of x are there such that $5 < x \le 20$?	1.	15
2.	A regular dodecahedron is a 12-sided, 3-dimensional object. If each side has an area of 5 cm², what is the surface area of the dodecahedron?	2.	60 cm²
3.	In the figure below, assume all the angles that appear to be right angles are actually right angles. What is the perimeter of the figure?	3.	18 units
4.	How much greater is $1+2+3+4+5+6+7+8+9+10$ than $1+2+3+4+5$?	4.	40
5.	Express $\dfrac{27}{5} + \dfrac{3}{4}$ in simplest terms.	5.	$\dfrac{123}{20}$
6.	Simplify $\dfrac{1}{2+\dfrac{1}{2+\dfrac{1}{2}}}$	6.	$\dfrac{5}{12}$
7.	What is x+2+x+2+x+2+x+2+x+2+x+2 if x is equal to 7?	7.	54
8.	What is $\dfrac{5\times4\times3\times2\times1}{3\times2\times1}$?	8.	20
9.	The gas gauge on my pickup truck says that it is one eighth full. After adding 12 gallons to the tank the gauge registers half full. What is the capacity of my gas tank in gallons?	9.	32 gals
10.	For the inequality $3 - x > 5$, is $x = 0$ a solution to the inequality?	10.	~~Yes~~ [No]
11.	What is the median of the first 10 whole numbers?	11.	5.5
12.	What is the area of a right triangle whose sides have lengths 3 cm, 4 cm, and 5 cm?	12.	6 cm²
13.	What is the result when the largest number in the set $\left\{\dfrac{1}{8}, 2, \dfrac{1}{4}, 0.3, 8\right\}$ is divided by the smallest number in the set?	13.	64
14.	A coin is flipped five times and comes up heads each of the five times. The next time the coin is flipped, what is the probability (expressed as a percent) it will come up heads?	14.	50 %

15. If 3 skirts and 2 shirts cost \$185, and 2 skirts and 3 shirts cost \$165, how much will 5 skirts and 5 shirts cost?	15. \$350
16. Find a if $10 \times \left(a - 10 \times \left(362 + 10 \times \left(24 + \dfrac{24}{4} \right) \right) \right) = 100$.	16. 6,630
17. Find two integers a and b greater than 1 such that $a \times (b+7) = 27$.	17. $a = 3,\ b = 2$
18. The product of 7 positive integers is 7. Find the sum of those 7 integers.	18. 13
19. What number gets increased by 2013 when multiplied by 4?	19. 671
20. Kelly telephoned Brook about a homework problem. Kelly said, "Four plus three times two is 14, isn't it?" Brook replied "No it's 10." Who was correct?	20. Brook
21. Which of the following cannot be the lengths of the sides of a triangle? **a)** 3, 4, 5 **b)** 5, 5, 3 **c)** 5, 5, 12 **d)** 5, 12, 13 **e)** 7, 7, 7	21. Circle one: a b [c] d e
22. What is the Greatest Common Divisor of 48 and 72?	22. 24
23. A line passing through the points (3, 5) and (-2, 2) is drawn on the coordinate plane. Where does this line intersect the y-axis? *a)* at $y = 1$ *b)* at $y = -1$ *c)* at $y = \dfrac{16}{5}$ *d)* at $y = \dfrac{5}{16}$	23. Circle one: a b [c] d
24. The circumference of a circle in centimeters is numerically equal to its area in centimeters². What is the radius of the circle in centimeters?	24. 2 cm
25. A square with sides of 10 inches and quarter circles drawn with the centers at the corners of the square and each with radii 5 inches is shown below. What is the area of the shaded area in square inches in terms of π? 	25. $100 - 25\pi$ in²
26. A committee of five students is chosen at random from a group of six girls and four boys. What is the probability the committee will contain exactly five girls? Express your answer as a common fraction.	26. $\dfrac{1}{42}$
27. How many different factors does 3,599 have?	27. 4 factors (1, 59, 61, and 3599)
28. Find the integer $n = \overline{abc}$ where a, b, and c are single digit numbers and b is twice a, and a is twice c, and $a + b + c = 14$.	28. 482
29. If $1 + 2 + 3 + \ldots + 2013 = 2{,}027{,}091$ what is the value of $2 + 4 + 6 \ldots + 2012$	29. 1,013,042
30. What is a if $(a+1) + (a+3) + (a+5) + \ldots (a+101) = 2{,}703$? **a)** 2 **b)** 7 **c)** 4 **d)** 5	30. Circle one: [a] b c d