Spring 2016 McNabb GDCTM Contest
Geometry

NO Calculators Allowed

1. How many edges does a prism with hexagonal bases have?

2. Find the ratio of the square of the circumference of a circle to the area of that same circle.

3. Find the value of k for which the point $(3k - 1, k)$ lies on the line $7x - 3y = 2$.

4. Three times the complement of what angle is equal to the supplement of that angle?

5. In a certain triangle the base is doubled and the height is tripled. What is the ratio of the area of the new triangle to the area of the orginal triangle?

6. The front face of a rectangular box has area 72. Its left face has area 48 while its top face has area 96. Find the volume of the box.

7. Find the area of a triangle with sides of length 9, 10, and 11.

8. Find the area of the parallelogram formed by the four lines

$$y = 3x - 7$$
$$y = 3x + 7$$
$$y = 7x - 3$$
$$y = 7x + 3$$

9. Find the coordinates of the center of the circumcircle of the triangle whose vertices are given by: $(2, 0), (0, 2),$ and $(10, 0)$.

10. In $\triangle ABC$, the bisector of $\angle A$ meets side BC at point D. Find the ratio of the area of $\triangle ABD$ to the area of $\triangle ADC$ if $AB = 13$ and $AC = 17$.

11. Let points A, B, C, and D lie evenly spaced on a line in that order. On BC as base an equilateral triangle BCP is drawn. If $AB = 12$, determine AP.

12. Two congruent circles have a common external tangent of length 20 and a common internal tangent of length 18. What is the common radius of the two circles?

13. Two circles intersect at points A and B. The tangents to the two circles at point A meet at right angles. The radius of the smaller circle is 8 and the radius of the larger circle is 15. Find the length of the AB.

14. A convex pentagon has side lengths in cyclic order as: $17, 6, 13, 26$, and 4. The sides of lengths 26 and 6 are parallel, and the sides of lengths 26 and 4 are perpendicular. What is the area of the pentagon?

15. In $\triangle ABC$, $AB = AC$, and P and Q are the midpoints respectively of AB and AC. Extend BC to point D so that $CD = BC$. Let PD meet AC at point R. Find the ratio of QR to AC.