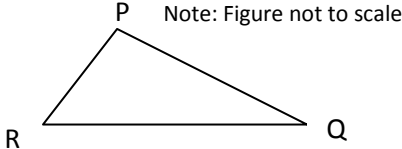
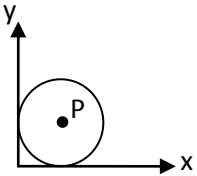
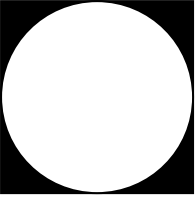
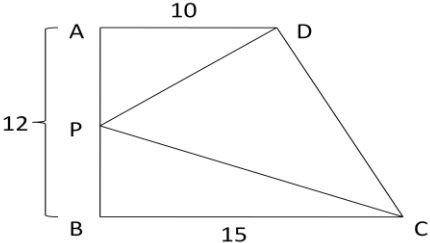
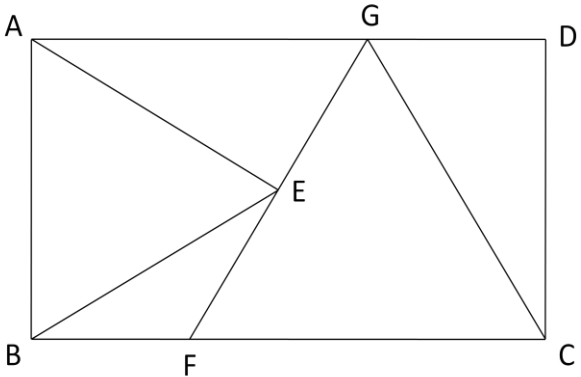




Knights of Pi Math Tournament – May 16, 2009  
Algebra & Geometry 5th/6th

1	Find the value of $x$ : $x = 536 + \left(\frac{936}{3}\right) - (2^3 - 21 \times 7)$
2	A unicycle has a wheel with a circumference of 6 feet. If the unicycle travels two miles, how many revolutions has its wheel made? (hint: 1/2 mile = 2640 feet)
3	A ladybug lives on a coordinate plane where the positive $y$ -axis is pointing north. It lands at the point $(2, 6)$ and crawls on a straight line toward the point $(8, 15)$ . How many units has the ladybug traveled to the east of where it landed at the time when its $y$ -coordinate is 10?
4	What is the area, in square cm, of a trapezoid with a height of 6 cm and base lengths in centimeters representing the smallest two prime numbers, respectively?
5	There are 2 pounds of apples for every 3 oranges and an orange for every 2 bananas. If 3.5 apples weigh one pound and there are 6 bananas, how many apples are there?
6	In isosceles triangle PQR, the measure of angle R is 96 degrees. What is the positive difference, in degrees, between the measures of angles P and Q?  <p>Note: Figure not to scale</p>
7	Kevin likes to eat everything he sees. He must eat exactly 100 pounds per meal. Turkeys weigh 40 pounds, elephants weight 50 pounds, camels weigh 20 pounds, and buffalos weigh 5 pounds. If Kevin eats exactly 3 whole animals in a meal, how many elephants does he eat?
8	The circle to the right is tangent to both the $x$ - and $y$ -axes. Given that the area of the circle is $169\pi$ , what are the coordinates of point P if P is the center of the circle? (Express your answer as a coordinate pair.) 
9	Right now, Anna is thirty-eight years older than Bob. Half her age two years from now will equal Bob's age one year from now. What is Anna's current age?
10	There is a triangle with side lengths 16, 17, and $x$ . If the triangle has a positive area and $x$ is an integer, how many possible values are there for $x$ ?
11	Austin's parents give him a fifty-dollar bill. Austin decides that he wants to buy some chips. If Doritos cost \$5.25 per bag and Fritos cost \$3.85 per bag, and Austin must buy at least 3 bags of Doritos, what is the maximum number of bags of Fritos he can buy?
12	A lamb is tethered to an outside corner of a square barn with sides measuring 33 meters. The rope holding the sheep extends 24 meters. What is the total area of the pasture in which the lamb can graze? (Express your answer in square meters in terms of $\pi$ .)

13	Solve for $p$ : $\begin{cases} 3q - 5p = 15 \\ q = 7 - 2p \end{cases}$
14	 <p>Find the area, in square inches, of the shaded region given that the diameter of the circle is 10 inches and the circle is internally tangent to all four sides of the square. (Express your answer as a decimal rounded to the nearest tenth.)</p>
15	Mr. Nonis is on a spaceship with an engine that runs on space goo. The fuel tank initially contains 60 galactic globules of space goo. It takes Mr. Nonis 8 jiffies to add a galactic globule of space goo to the fuel tank. The engine burns 3 galactic globules of space goo every 16 jiffies. If Mr. Nonis adds space goo to the fuel tank as fast as he can, how long, in jiffies, can the spaceship's engine run continuously?
16	1000 unit cubes are assembled to form a larger cube with side length 10. The outside of this large cube is painted. The cube is then disassembled into unit cubes. What is the total number of unpainted faces on cubes that have at least one face painted?
17	You draw four distinct lines on a square sheet of paper. Each line must touch two edges of the paper. If you then cut the paper along each line, what is the positive difference between the smallest and the greatest number of pieces of paper that can result?
18	<p>If triangle <math>DPC</math>'s area is less than or equal to <math>\frac{8}{15}</math> the area of the trapezoid <math>ABCD</math>, how many integer values could <math>\overline{BP}</math> have?</p> 
19	<p>If the figure <math>ABCD</math> is a rectangle and the two triangles are equilateral triangles, not necessarily the same size, what is the ratio of <math>AB</math> to <math>BC</math>?</p> 
20	A parabola in the Cartesian coordinate system is defined by the function $f(x) = x^2 - 5x + 2$ . Given that $\int f(x) dx = \frac{1}{3}x^3 - \frac{5}{2}x^2 + kx + C$ , $\prod_{x=k}^2 \sin x = a$ , and that $b = \sqrt[3]{a}$ , what are the coordinates of the origin?