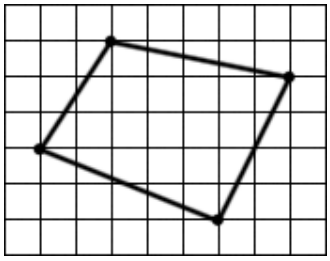
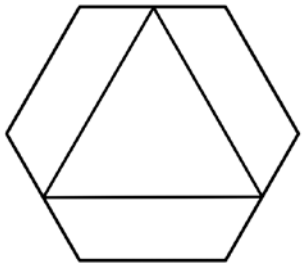
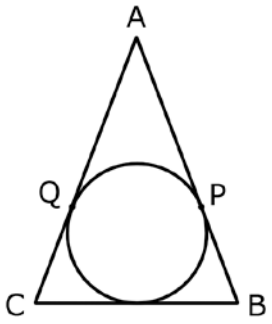
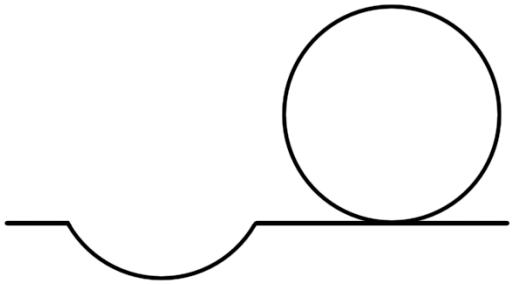
Knights of Pi Math Tournament – Dec. 4, 2010

Geometry 7th/8th

1	What is the length of the hypotenuse of a right triangle with leg lengths 9 units and 40 units?
2	What is the area of the largest square that can be inscribed in a circle of radius $\frac{5\sqrt{2}}{2}$ units?
3	A 4cm x 4cm x 4cm cube is painted on all faces and then divided into cubes measuring 1cm on each edge. How many smaller cubes have paint on at least one face?
4	A parallelogram has an angle that is $30°$ greater than another one of its angles. What is the measure of the smaller angle of this parallelogram in degrees?
5	Find the area of the quadrilateral shown given that each square has an area of 1 square unit. 
6	A triangle is drawn inside of a regular hexagon with side length 8 by joining three of the sides' midpoints. What is the area of the triangle? 
7	How many regular polygons have interior angles that measure an integer number of degrees?

8	Let a circle be inscribed in a triangle ABC. $AB = AC = 8$ units and $BC = 4$ units. Let the points of tangency between the circle and sides AB and AC be P and Q respectively. Find the distance PQ. *Note: Drawing is not to scale.* 
9	A perfectly spherical ball was floating in water, when all of a sudden, the water froze over. Days later I remove the ball from the ice. The dent in the ice left by the ball measures 6 inches wide and 2 inches deep. What is the radius of the ball in inches? 
10	A circle is inscribed in an equilateral triangle with side length 8 units. A smaller circle is inscribed internally tangent to the triangle but externally tangent to the larger circle. What is the radius of this smaller circle?