MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2011
ROUND 5 PLANE GEOMETRY: CIRCLES

ANSWERS

A) _____ sq. units

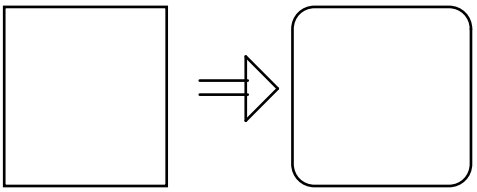
B) _____

C) _____ °

******* NO CALCULATORS ON THIS ROUND *******

A) A quarter is placed on top of a table. Then k quarters are placed around the given quarter so that each is tangent to the given quarter and to two others. Compute the minimum area of a single coin that will cover all of these $(k + 1)$ quarters. Assume the diameter of a quarter is exactly 1 inch.

B) A square is replaced by a square with rounded corners, thereby losing 1/10 of its area. If x and r denote the edge of the square and the radius of the rounded corner respectively , then compute $\frac{x^2}{r^2}$.



C) Given: $m\angle BCE = 140°$, $m\angle P = (5x+3)°$

$m\left(\overset{\frown}{BD}\right) = (15x+8)°$, $m\left(\overset{\frown}{AE}\right) = (6x-6)°$

Compute $m\angle AED$.