Triangle Problems   Name _____
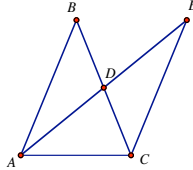September 24, 2009

1. Triangle ABC is an isosceles triangle with $AB = BC$. Point D is the midpoint of both $\overline{BC}$ and
    $\overline{AE}$, and $\overline{CE}$ is 11 units long. Triangle ABD is congruent to triangle ECD. What is the
    length of $\overline{BD}$?

   (A) 4   (B) 4.5   (C) 5   (D) 5.5   (E) 6

2. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle
are 6.1 cm, 8.2 cm and 9.7 cm. What is the area of the square in square centimeters?
    (A) 24   (B) 25   (C) 36   (D) 48   (E) 64

3. How many different isosceles triangles have integer side lengths and perimeter 23?
(A) 2   (B) 4   (C) 6   (D) 9   (E) 11

4. How many distinct triangles can be drawn using three of the dots below as vertices?

   (A) 9   (B) 12   (C) 18   (D) 20   (E) 24

5. Isosceles right triangle ABC encloses a semicircle of area 2π. The circle has its center O on
hypotenuse $\overline{AB}$ and is tangent to sides $\overline{AC}$ and $\overline{BC}$. What is the area of triangle ABC?

 (A) 6 (B) 8 (C) 3π (D) 10 (E) 4π
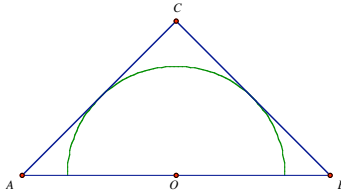
6. What is the maximum number for the possible points of intersection of a circle and a triangle?
(A) 2   (B) 3   (C) 4   (D) 5   (E) 6

7. A regular octagon is formed by cutting an isosceles right triangle from each of the corners of
a square with sides of length 2000. What is the length of each side of the octagon?

(A) $\frac{1}{3}(2000)$ (B) $2000(\sqrt{2}-1)$ (C) $2000(2-\sqrt{2})$ (D) 1000   (E) $1000\sqrt{2}$