Geometry

1. A solid box is 15 cm by 10 cm by 8 cm. A new solid is formed by removing a cube 3 cm on a side from each corner of this box. What percent of the original volume is removed?

   (A) 4.5 **(B)** 9 **(C)** 12 **(D)** 18 **(E)** 24

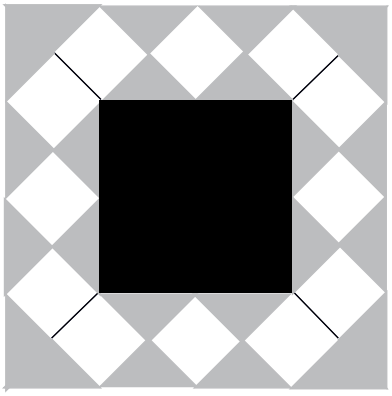
2. Find the degree measure of an angle whose complement is 25% of its supplement.

   (A) 48 **(B)** 60 **(C)** 75 **(D)** 120 **(E)** 150

3. Let v, w, x, y, and z be the degree measures of the five angles of a pentagon. Suppose $v < w < x < y < z$ and v, w, x, y, and z form an arithmetic sequence. Find the value of x.

   (A) 72 **(B)** 84 **(C)** 90 **(D)** 108 **(E)** 120

4. Betsy designed a flag using blue triangles (▩), small white squares (□), and a red center square(■), as shown. Let B be the total area of the blue triangles, W the total area of the white squares, and R the area of the red square. Which of the following is correct?

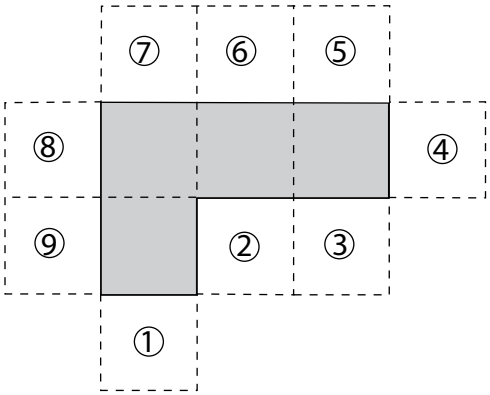


   (A) $B = W$ **(B)** $W = R$ **(C)** $B = R$ **(D)** $3B = 2R$ **(E)** $2R = W$

5. A square and an equilateral triangle have the same perimeter. Let A be the area of the circle circumscribed about the square and B be the area of the circle circumscribed about the triangle. Find A/B.

   (A) $\frac{9}{16}$ **(B)** $\frac{3}{4}$ **(C)** $\frac{27}{32}$ **(D)** $\frac{3\sqrt{6}}{8}$ **(E)** 1

6. The polygon enclosed by the solid lines in the figure consists of 4 congruent squares joined edge-to-edge. One more congruent square is attached to an edge at one of the nine positions indicated. How many of the nine resulting polygons can be folded to form a cube with one face missing?



   (A) 2 **(B)** 3 **(C)** 4 **(D)** 5 **(E)** 6

7. A regular octagon $ABCDEFGH$ has sides of length two. Find the area of $\triangle ADG$.

   (A) $4 + 2\sqrt{2}$ **(B)** $6 + \sqrt{2}$ **(C)** $4 + 3\sqrt{2}$ **(D)** $3 + 4\sqrt{2}$ **(E)** $8 + \sqrt{2}$