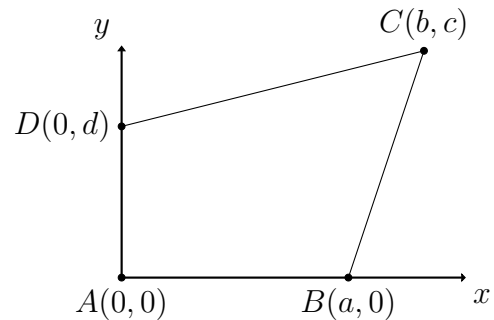1. A circle is inscribed in the isosceles triangle with respective side lengths 6, 6 and 4. Determine the area of the inscribed circle.

   (a) $\pi/2$

   (b) $3\pi/2$

   (c) $5\pi/2$

   (d) $7\pi/2$

   (e) None of these

2. Quadrilateral $ABCD$ in the Cartesian plane is pictured below. Determine the area enclosed by $ABCD$. (You may assume $b > a$ and $c > d$ as pictured.)

   (a) Area $= \frac{1}{4}(a+b)(d+c)$

   (b) Area $= \frac{1}{4}(a+d)(b+c)$

   (c) Area $= \frac{1}{2}(ad+bc)$

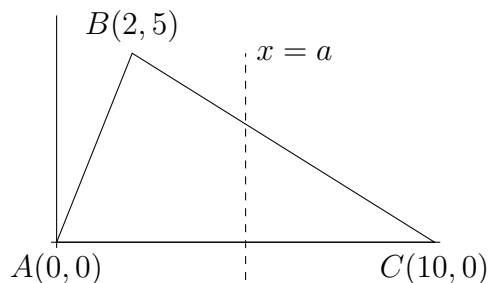   (d) Area $= \frac{1}{2}(ac+bd)$

   (e) None of these

3. What is the volume of the cube that circumscribes the sphere that circumscribes the cube that circumscribes the sphere of radius 1 inch?

   (a) $9\sqrt{3}$ in^3

   (b) $16\sqrt{2}$ in^3

   (c) $24\sqrt{3}$ in^3

   (d) $54\sqrt{2}$ in^3

   (e) None of these

4. What is the value of a so that the vertical line $x = a$ divides the triangle $\triangle ABC$ pictured below into two regions of equal area?
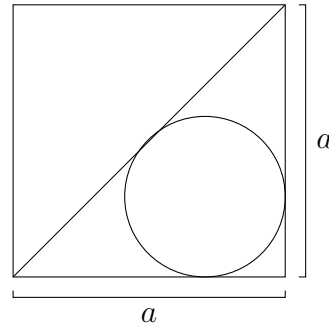
   (a) $a = \sqrt{7}$

   (b) $a = \frac{7}{2}$

   (c) $a = 3$

   (d) $a = 10 - 2\sqrt{10}$

   (e) None of these

5. In the figure below, the rectangle is a square, whose side lengths are all equal to the value a, and the circle is inscribed as pictured. Determine the radius, r, of the inscribed circle.

   (a) $r = a(\frac{\sqrt{2}}{2})$

   (b) $r = a(1 - \frac{\sqrt{2}}{2})$

   (c) $r = a(\sqrt{2} - 1)$

   (d) $r = a(2 - \sqrt{2})$

   (e) None of these

6. Two $2' \times 2'$ squares share the same center and one square is rotated $45°$ with respect to the other square (see picture below). Determine the shaded area that is enclosed by both squares.

   (a) $4\sqrt{2} - 4$ ft^2

   (b) $4\sqrt{2} + 4$ ft^2

   (c) $2\sqrt{2} + 2$ ft^2

   (d) $8\sqrt{2} - 8$ ft^2

   (e) None of these
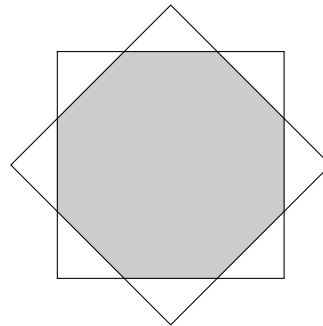
7. A circle is inscribed in a square. A square is inscribed in that circle. A second circle is inscribed in that square. What is the ratio of the area of the smallest circle to the area of the largest square?

   (a) $\pi/2$

   (b) $\pi^2/4$

   (c) $\pi/8$

   (d) $\pi^2/16$

   (e) None of these
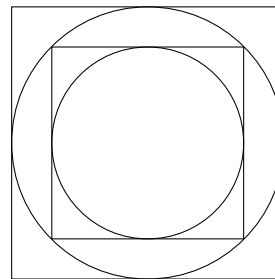
8. A cylinder with radius r and height h has volume 1 and total surface area 12. Compute $\frac{1}{r} + \frac{1}{h}$.

   (a) $\frac{1}{12}$

   (b) $\frac{1}{6}$

   (c) 6

   (d) 12