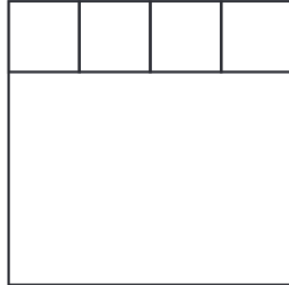


1

can be solved by counting, no formula 2D geometry

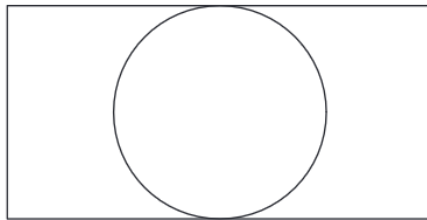
- 2010A 2. Four identical squares and one rectangle are placed together to form one large square as shown. The length of the rectangle is how many times as large as its width?



- (A) $\frac{5}{4}$ (B) $\frac{4}{3}$ (C) $\frac{3}{2}$ (D) 2 (E) 3

2012B

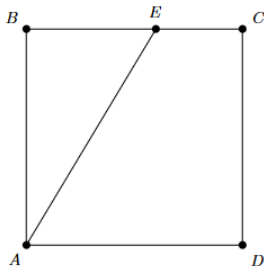
2. A circle of radius 5 is inscribed in a rectangle as shown. The ratio of the length of the rectangle to its width is 2 : 1. What is the area of the rectangle?



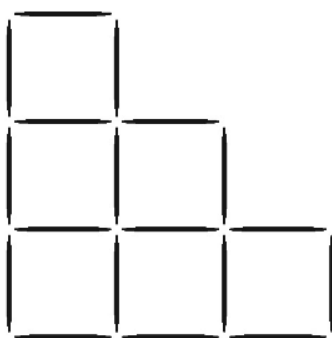
- (A) 50 (B) 100 (C) 125 (D) 150 (E) 200

- 2013A 3. Square $ABCD$ has side length 10. Point E is on \overline{BC} , and the area of $\triangle ABE$ is 40. What is BE ?

- (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

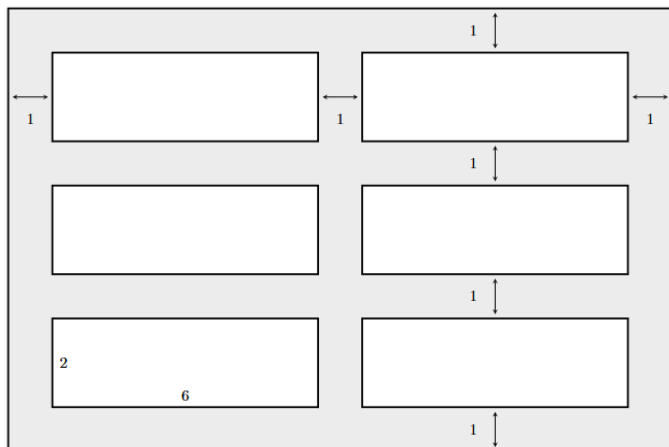


- 2015A 3. Ann made a 3-step staircase using 18 toothpicks as shown in the figure. How many toothpicks does she need to add to complete a 5-step staircase?



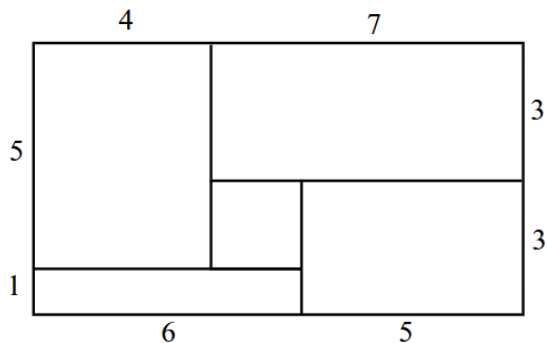
- (A) 9 (B) 18 (C) 20 (D) 22 (E) 24

- 2017A 3. Tamara has three rows of two 6-foot by 2-foot flower beds in her garden. The beds are separated and also surrounded by 1-foot-wide walkways, as shown on the diagram. What is the total area of the walkways, in square feet?



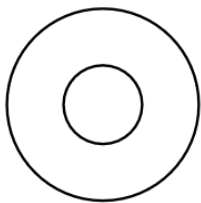
- (A) 72 (B) 78 (C) 90 (D) 120 (E) 150

- 2003B 4. Rose fills each of the rectangular regions of her rectangular flower bed with a different type of flower. The lengths, in feet, of the rectangular regions in her flower bed are as shown in the figure. She plants one flower per square foot in each region. Asters cost \$1 each, begonias \$1.50 each, cannas \$2 each, dahlias \$2.50 each, and Easter lilies \$3 each. What is the least possible cost, in dollars, for her garden?



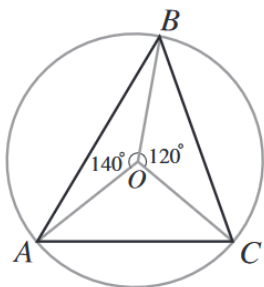
- (A) 108 (B) 115 (C) 132 (D) 144 (E) 156

- 2006B 4. Circles of diameter 1 inch and 3 inches have the same center. The smaller circle is painted red, and the portion outside the smaller circle and inside the larger circle is painted blue. What is the ratio of the blue-painted area to the red-painted area?



- (A) 2 (B) 3 (C) 6 (D) 8 (E) 9

- 2007B 4. The point O is the center of the circle circumscribed about $\triangle ABC$, with $\angle BOC = 120^\circ$ and $\angle AOB = 140^\circ$, as shown. What is the degree measure of $\angle ABC$?



- (A) 35 (B) 40 (C) 45 (D) 50 (E) 60

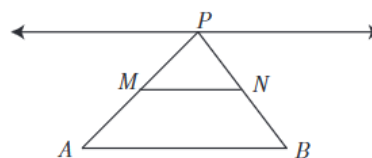
- 2009B 4. A rectangular yard contains two flower beds in the shape of congruent isosceles right triangles. The remainder of the yard has a trapezoidal shape, as shown. The parallel sides of the trapezoid have lengths 15 and 25 meters. What fraction of the yard is occupied by the flower beds?



- (A) $\frac{1}{8}$ (B) $\frac{1}{6}$ (C) $\frac{1}{5}$ (D) $\frac{1}{4}$ (E) $\frac{1}{3}$

- 2000 5. Points M and N are the midpoints of sides PA and PB of $\triangle PAB$. As P moves along a line that is parallel to side AB , how many of the four quantities listed below change?

- (a) the length of the segment MN
 (b) the perimeter of $\triangle PAB$
 (c) the area of $\triangle PAB$
 (d) the area of trapezoid $ABNM$

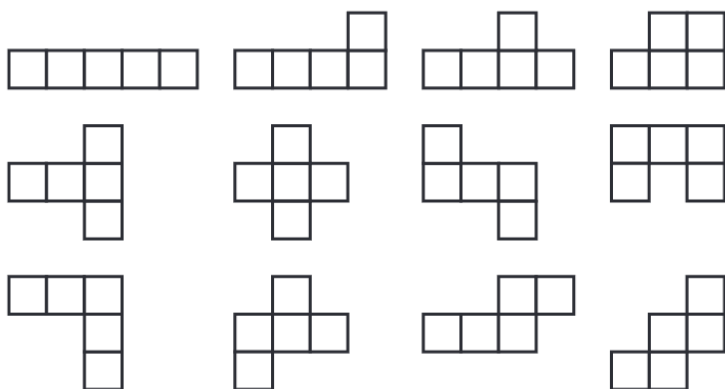


- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

2001

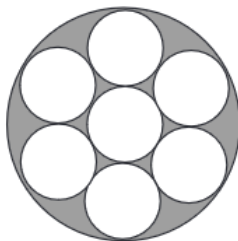
5. How many of the twelve pentominoes pictured below have at least one line of symmetry?

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7



2002A

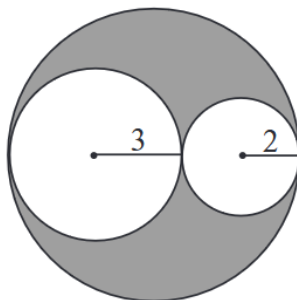
5. Each of the small circles in the figure has radius one. The innermost circle is tangent to the six circles that surround it, and each of those circles is tangent to the large circle and to its small-circle neighbors. Find the area of the shaded region.



- (A) π (B) 1.5π (C) 2π (D) 3π (E) 3.5π

2002B

5. Circles of radius 2 and 3 are externally tangent and are circumscribed by a third circle, as shown in the figure. Find the area of the shaded region.



- (A) 3π (B) 4π (C) 6π (D) 9π (E) 12π

- 2014B 5. Doug constructs a square window using 8 equal-size panes of glass, as shown. The ratio of the height to width for each pane is $5 : 2$, and the borders around and between the panes are 2 inches wide. In inches, what is the side length of the square window?



- (A) 26 (B) 28 (C) 30 (D) 32 (E) 34