2

2D need formula or calcuation Geometry

2007B 1. **Answer (E):** The perimeter of each bedroom is $2(12 + 10) = 44$ feet, so the surface to be painted in each bedroom has an area of $44 \cdot 8 - 60 = 292$ square feet. Since there are 3 bedrooms, Isabella must paint $3 \cdot 292 = 876$ square feet.

2018B 1. **Answer (A):** The total area of cornbread is $20 \cdot 18 = 360$ in^2. Because each piece of cornbread has area $2 \cdot 2 = 4$ in^2, the pan contains $360 \div 4 = 90$ pieces of cornbread.

OR

When cut, there are $20 \div 2 = 10$ pieces of cornbread along a long side of the pan and $18 \div 2 = 9$ pieces along a short side, so there are $10 \cdot 9 = 90$ pieces.

2012A 2. **Answer (E):** The length of each rectangle is equal to the side length of the square. The width of each rectangle is half the side length of the square, so the rectangle's dimensions are 4 by 8.

2013B 2. **Answer (A):** The garden is $2 \cdot 15 = 30$ feet wide and $2 \cdot 20 = 40$ feet long. Hence Mr. Green expects $\frac{1}{2} \cdot 30 \cdot 40 = 600$ pounds of potatoes.

2015A

2. **Answer (D):** Counting 3 edges per tile gives a total of $3 \cdot 25 = 75$ edges, and exactly 1 edge per square tile is missing. So there are exactly $84 - 75 = 9$ square tiles.

OR

Let x be the number of square tiles in the box. Then there are $25 - x$ triangular tiles and $4x + 3(25 - x) = 84$ edges. Solving for x gives $x = 9$ square tiles.

2003A

3. (D) The total volume of the eight removed cubes is $8 \times 3^3 = 216$ cubic centimeters, and the volume of the original box is $15 \times 10 \times 8 = 1200$ cubic centimeters. Therefore the volume has been reduced by $\left(\frac{216}{1200}\right)(100\%) = 18\%$.

2007A

3. **Answer (D):** The brick has a volume of $40 \cdot 20 \cdot 10 = 8000$ cubic centimeters. Suppose that after the brick is placed in the tank, the water level rises by h centimeters. Then the additional volume occupied in the aquarium is $100 \cdot 40 \cdot h = 4000h$ cubic centimeters. Since this must be the same as the volume of the brick, we have

$$8000 = 4000h \quad \text{and} \quad h = 2 \text{ centimeters}$$

2011B

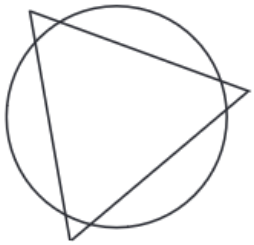
3. **Answer (A):** The smallest possible width for the rectangle is $2 - 0.5 = 1.5$ inches. Similarly the smallest possible length is 2.5 inches. Hence the minimum area is $(1.5)(2.5) = 3.75$ square inches.

2012B

3. **Answer (E):** The distance from -2 to -6 is $|(-6)-(-2)| = 4$ units. The distance from -6 to 5 is $|5-(-6)| = 11$ units. Altogether the bug crawls $4+11 = 15$ units.

2001

4. **(E)** The circle can intersect at most two points of each side of the triangle, so the number can be no greater than six. The figure shows that the number can indeed be six.



2005A

4. **(B)** Let w be the width of the rectangle. Then the length is $2w$, and

$$x^2 = w^2 + (2w)^2 = 5w^2.$$

The area is consequently $w(2w) = 2w^2 = \frac{2}{5}x^2$.

2012A

4. **Answer (C):** Ray AB is common to both angles, so the degree measure of $\angle CBD$ is either $24+20 = 44$ or $24-20 = 4$. The smallest possible degree measure is 4.

2018B

4. **Answer (B):** Without loss of generality, assume that $X \leq Y \leq Z$. Then the geometric description of the problem can be translated into the system of equations, $XY = 24$, $XZ = 48$, and $YZ = 72$. Dividing the second equation by the first yields $\frac{Z}{Y} = 2$, so $Z = 2Y$. Then $72 = YZ = 2Y^2$, so $Y^2 = 36$. Because Y is positive, $Y = 6$. It follows that $X = 24 \div 6 = 4$ and $Z = 72 \div 6 = 12$, so $X + Y + Z = 22$.

OR

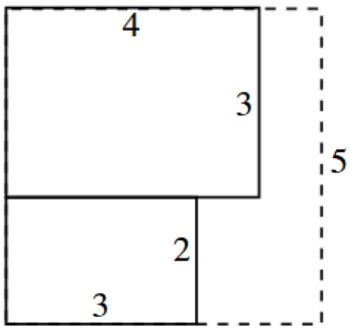
With X, Y, and Z as above, multiply the three equations to give

$$X^2Y^2Z^2 = 24 \cdot 48 \cdot 72 = 24 \cdot 24 \cdot 2 \cdot 24 \cdot 3 = 24^2 \cdot 144 = (24 \cdot 12)^2.$$

Therefore $XYZ = 24 \cdot 12$, and dividing successively by the three equations gives $Z = 12$, $Y = 6$, and $X = 4$, so $X + Y + Z = 22$.

2006B

5. **(B)** The side length of the square is at least equal to the sum of the smaller dimensions of the rectangles, which is $2 + 3 = 5$.



If the rectangles are placed as shown, it is in fact possible to contain them within a square of side length 5. Thus the smallest possible area is $5^2 = 25$.

2010A

5. **Answer (E):** Because the circumference is $2\pi r = 24\pi$, the radius r is 12. Therefore the area is $\pi r^2 = 144\pi$, and $k = 144$.