UNIT 3 EXERCISES 1-5

2D GEOMETRY WORD PROBLEMS

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.

2014A 2. **Answer (B):** Because child tickets are half the price of adult tickets, the price of 5 adult tickets and 4 child tickets is the same as the price of $5 + \frac{1}{2} \cdot 4 = 7$ adult tickets. In the same way, the price of 8 adult tickets and 6 child tickets is the same as the price of $8 + \frac{1}{2} \cdot 6 = 11$ adult tickets, which is equal to $11 \cdot \frac{1}{7} \cdot 24.50 = 38.50$ dollars.

2005A 3. **(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 $w(2w) = 2w^2 = \frac{2}{5}x^2$.

2018B 3. **Answer (B):** The line with slope 2 containing the point $(40, 30)$ has the equation $y - 30 = 2(x - 40)$. Similarly, the line with slope 6 containing the point $(40, 30)$ has the equation $y - 30 = 6(x - 40)$. To find the x-intercepts of these two lines, let $y = 0$ and solve for x separately in each of these two equations. With the first equation the x-intercept is 25, and with the second equation the x-intercept is 35. Thus the distance between the two x-intercepts is $|25 - 35| = 10$.

OR

As the line with slope 2 rises from $y = 0$ to $y = 30$, x increases by 15. As the line with slope 6 rises from $y = 0$ to $y = 30$, x increases by 5. Thus the distance between the x-intercepts is $|15 - 5| = 10$.

2003B 4. (C) The area of the lawn is

$$90 \cdot 150 = 13{,}500 \text{ ft}^2.$$

Moe cuts about two square feet for each foot he pushes the mower forward, so he cuts $2(5000) = 10{,}000$ ft^2 per hour. Therefore, it takes about $\frac{13{,}500}{10{,}000} = 1.35$ hours.

2017A

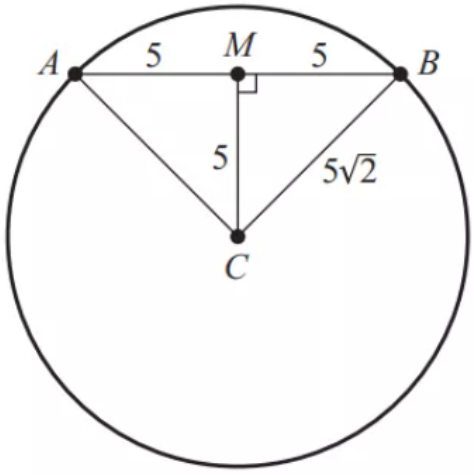
4. **Answer (A):** If the square had side length x, then Jerry's path had length $2x$, and Silvia's path along the diagonal, by the Pythagorean Theorem, had length $\sqrt{2}x$. Therefore Silvia's trip was shorter by $2x - \sqrt{2}x$, and the required percentage is

$$\frac{2x - \sqrt{2}x}{2x} = 1 - \frac{\sqrt{2}}{2} \approx 1 - 0.707 = 0.293 = 29.3\%.$$

The closest of the answer choices is 30%.

2018B

4. **Answer (B):** Let the chord have endpoints A and B, and let C be the center of the circle. The segment from C to the midpoint M of $\overline{AB}$ is perpendicular to $\overline{AB}$ and has length 5. This creates the $45-45-90^\circ$ triangle CMB, whose sides are 5, 5, and $CB = 5\sqrt{2}$. Therefore the radius of the circle is $5\sqrt{2}$, and the area of the circle is $\pi \cdot \left(5\sqrt{2}\right)^2 = 50\pi$.



2004A 5. **(B)** The y-intercept of the line is between 0 and 1, so $0 < b < 1$. The slope is between -1 and 0, so $-1 < m < 0$. Thus $-1 < mb < 0$.