Lesson 15 Practice Problems

1. Solve this system of linear equations without graphing: $\begin{cases} 5x + 4y = 8 \\ 10x - 4y = 46 \end{cases}$

2. Select **all** the equations that share a solution with this system of equations.

   $\begin{cases} 5x + 4y = 24 \\ 2x - 7y = 26 \end{cases}$

   A. $7x + 3y = 50$

   B. $7x - 3y = 50$

   C. $5x + 4y = 2x - 7y$

   D. $3x - 11y = -2$

   E. $3x + 11y = -2$

3. Students performed in a play on a Friday and a Saturday. For both performances, adult tickets cost a dollars each and student tickets cost s dollars each.

   On Friday, they sold 125 adult tickets and 65 student tickets, and collected \$1,200. On Saturday, they sold 140 adult tickets and 50 student tickets, and collect \$1,230.

   This situation is represented by this system of equations: $\begin{cases} 125a + 65s = 1{,}200 \\ 140a + 50s = 1{,}230 \end{cases}$

   a. What could the equation $265a + 115s = 2{,}430$ mean in this situation?

   b. The solution to the original system is the pair $a = 7$ and $s = 5$. Explain why it makes sense that this pair of values is also a solution to the equation $265a + 115s = 2{,}430$.

4. Which statement explains why $13x - 13y = -26$ shares a solution with this system of equations: $\begin{cases} 10x - 3y = 29 \\ -3x + 10y = 55 \end{cases}$

   A. Because $13x - 13y = -26$ is the product of the two equations in the system of equations, it must share a solution with the system of equations.

   B. The three equations all have the same slope but different y-intercepts. Equations with the same slope but different y-intercepts always share a solution.

   C. Because $10x - 3y$ is equal to 29, I can add $10x - 3y$ to the left side of $-3x + 10y = 55$ and add 29 to the right side of the same equation. Adding equivalent expressions to each side of an equation does not change the solution to the equation.

   D. Because $-3x + 10y$ is equal to 55, I can subtract $-3x + 10y$ from the left side of $10x - 3y = 29$ and subtract 55 from its right side. Subtracting equivalent expressions from each side of an equation does not change the solution to the equation.

5. Select **all** equations that can result from adding these two equations or subtracting one from the other. $\begin{cases} x + y = 12 \\ 3x - 5y = 4 \end{cases}$

   A. $-2x - 4y = 8$

   B. $-2x + 6y = 8$

   C. $4x - 4y = 16$

   D. $4x + 4y = 16$

   E. $2x - 6y = -8$

   F. $5x - 4y = 28$

(From Unit 2, Lesson 14.)

6. Solve each system of equations.

   a. $\begin{cases} 7x - 12y = 180 \\ 7x = 84 \end{cases}$

   b. $\begin{cases} \text{-}16y = 4x \\ 4x + 27y = 11 \end{cases}$

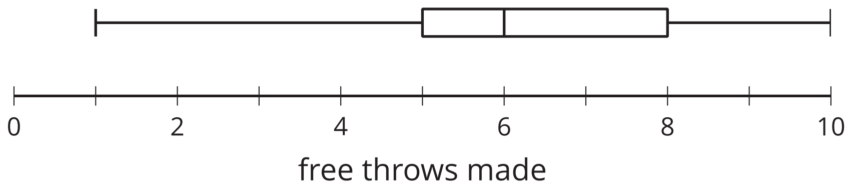
   (From Unit 2, Lesson 13.)

7. Here is a system of equations: $\begin{cases} 7x - 4y = \text{-}11 \\ 7x + 4y = \text{-}59 \end{cases}$

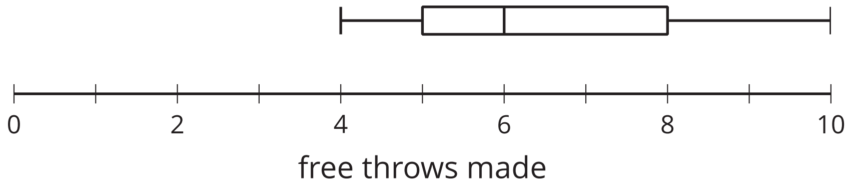
   Would you rather use subtraction or addition to solve the system? Explain your reasoning.

   (From Unit 2, Lesson 14.)

8. The box plot represents the distribution of the number of free throws that 20 students made out of 10 attempts.



After reviewing the data, the value recorded as 1 is determined to have been an error. The box plot represents the distribution of the same data set, but with the minimum, 1, removed.



The median is 6 free throws for both plots.

a. Explain why the median remains the same when 1 was removed from the data set.

b. When 1 is removed from the data set, does the mean remain the same? Explain your reasoning.

(From Unit 1, Lesson 10.)

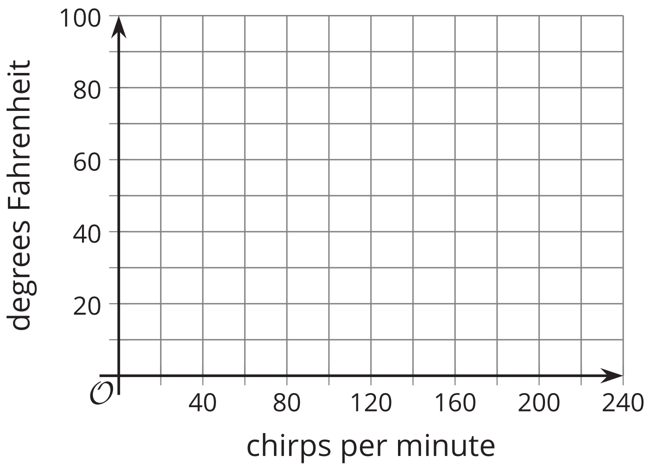
9. In places where there are crickets, the outdoor temperature can be predicted by the rate at which crickets chirp. One equation that models the relationship between chirps and outdoor temperature is $f = \frac{1}{4}c + 40$, where c is the number of chirps per minute and f is the temperature in degrees Fahrenheit.

   a. Suppose 110 chirps are heard in a minute. According to this model, what is the outdoor temperature?

   b. If it is $75^\circ F$ outside, about how many chirps can we expect to hear in one minute?

   c. The equation is only a good model of the relationship when the outdoor temperature is at least $55^\circ F$. (Below that temperature, crickets aren't around or inclined to chirp.) How many chirps can we expect to hear in a minute at that temperature?

   d. On the coordinate plane, draw a graph that represents the relationship between the number of chirps and the temperature.



   e. Explain what the coefficient $\frac{1}{4}$ in the equation tells us about the relationship.

   f. Explain what the 40 in the equation tells us about the relationship.

(From Unit 2, Lesson 10.)