Section 4.3

1. Solution: (1, 1)
   \[ y = -x \]
   \[ y = x + 2 \]
   \[ 1 = -1 \]
   \[ 1 = 1 + 2 \]
   \[ 1 = 1 \]
   The solution (1, 1) checks.

3. a. Answers may vary. Statement 1: (1, 9), (2, 8), (3, 7); statement 2: (10, 5), (9, 4), (8, 3)
   b. and c.
   ![Graph](image)
   d. The intersection must satisfy both statements; the pair of numbers must sum to 10 and have a difference of 5.
   e. In the above graph, the solution appears to be (7.5, 2.5). Substituting the solution in both equations gives a check.

5. In the Y= menu enter \( Y_1 = X + 1, \ Y_2 = X - 3 \). Press GRAPH, make sure the intersection appears on the screen. If not, adjust the window. Press 2nd CALC, then press 5 for INTERSECT. Press ENTER three times and the intersection appears on the bottom of the screen.

7. \( Y_1 = X + 1, \ Y_2 = X - 2 \)

No solution, the system is inconsistent. The slopes of the equations \( Y_1 \) and \( Y_2 \) are the same and the y-intercepts are different. This tells us the lines are parallel and confirms that the system has no solution.
Caution: sometimes two lines appear parallel on a calculator but might actually intersect somewhere outside the window. 2nd CALC, INTERSECT will not find an intersection unless the lines cross on your screen.

9. \( Y_1 = \frac{4}{3}X - \frac{1}{3}, \ Y_2 = 2X - \frac{1}{2} \)

Solution = (.25, 0)

11. \( Y_1 = 7X, \ Y_2 = \frac{1}{3}X + \frac{2}{3} \)

Solution = (1, 7)

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13. a. For each additional 10 miles, Pinnacle's cost increases by $2.50 and the competitor's cost increases by $.50.

<table>
<thead>
<tr>
<th>Miles Driven</th>
<th>Pinnacle's Cost</th>
<th>Competitor's Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>$20.50</td>
<td>$22.50</td>
</tr>
<tr>
<td>60</td>
<td>$23.00</td>
<td>$23.00</td>
</tr>
<tr>
<td>70</td>
<td>$25.50</td>
<td>$23.50</td>
</tr>
</tbody>
</table>

b. At 60 miles both rental cars cost the same.

c. Intersection point

15. a. \( Y_1 = .10X + 35, \) \( Y_2 = .15X + 10 \)

The variables miles and cost are nonnegative in this real life problem so we use a first quadrant window \((X_{\text{min}} = 0, Y_{\text{min}} = 0)\). We can get a rough idea for \(X_{\text{max}}\) and \(Y_{\text{max}}\) by looking at a table. Press 2nd TBLSET and set \(\Delta Tbl = 20\) then press 2nd TABLE and scroll down until you find a value of \(X\) where \(Y_1\) and \(Y_2\) are about the same. Use the value of \(X\) and \(Y_1\) to pick suitable values for \(X_{\text{max}}\) and \(Y_{\text{max}}\). Windows may vary: \(X_{\text{min}} = 0, X_{\text{max}} = 940, Y_{\text{min}} = 0, Y_{\text{max}} = 150\)

b. At 500 miles, both companies charge $85.

c. Udrive is cheaper for rentals of more than 500 miles. Each additional mile at Udrive is 10 cents, whereas Mile Rent-a-Car is 15 cents.

Skills and Review 4.3

17. a. Look at the table and find Pinnacle's cost when 0 miles are driven.

b. The rate of change is constant so pick any two points to find the slope.

\[
m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10.50 - 8.00}{10 - 0} = \frac{2.50}{10} = 0.25
\]

The rate of change is $.25 per mile.

19. a. \( m = -3, y\)-intercept = (0, 2); the equation is in slope-intercept form, so the slope is the coefficient of \(x\) and \(b\) is the constant.

b. Put the equation in slope-intercept form to find the slope and \(y\)-intercept.

\[
\begin{align*}
3x - 2y &= 6 & \text{Standard form} \\
+3x - 2y &= 3x + 6 \\
-2y &= 3x + 6 \\
-2 &= 2 \\
y &= \frac{3}{2} x - 3 & \text{Slope-intercept form} \\
m &= \frac{3}{2} \text{ and } y\text{-intercept} = (0, -3)
\end{align*}
\]

21. We could use the slope formula to find the rate of change or notice that for each additional hour, the number of vehicles decreases by 750. This gives a rate of change of -750 vehicles/hour.

23. \( P = 2L + 2W \) when \( L = 4.5 \text{ cm} \) and \( P = 15 \text{ cm} \)

\[
\begin{align*}
15 &= 2 \times 4.5 + 2W \\
15 &= 9 + 2W \\
6 &= 2W \\
3 &= W
\end{align*}
\]

The width \( W \) is 3 cm.

25. a. \( 3x + 6 - (8x - 4) \)

\[
= 3x + 6 - 8x + 4 \\
= -5x + 10
\]

b. \( 3x + 6 - (8x - 4) \) when \( x = -3 \)

\[
= 3(-3) + 6 - (8(-3) - 4) \\
= -9 + 6 - (24 - 4) \\
= -9 + 20 \\
= 11
\]

c. \( -5x + 10 \) when \( x = -3 \)

\[
= -5(-3) + 10 \\
= 15 + 10 \\
= 25
\]

d. Yes, the evaluations agree.