TOPIC 3: Linear Equations and Inequalities

1. Solve: \[ \frac{2x-4}{x+6} = -\frac{2}{15} \]

2. Solve for the common solutions by substitution or linear combinations. State whether the lines are parallel, perpendicular, intersecting but not perpendicular, or the same line.
   
   \[
   \begin{align*}
   x - y &= 5 \\
   2x - y &= -1
   \end{align*}
   \]

3. Solve for the common solutions by substitution or linear combinations. State whether the lines are parallel, perpendicular, intersecting but not perpendicular, or the same line.
   
   \[
   \begin{align*}
   2x - y &= 3 \\
   4x &= 6 + 2y
   \end{align*}
   \]

4. Find the slope and the y-intercept. Then sketch the graph: \(3x - 2y = 6\)

5. Find and equation of the line through (-3, -5) and (2, -2)

6. Graph and write an equation for the vertical line through the point (-2, 3)

7. Solve and graph on the number line: \[-2x + 3 < 9\]

8. Graph on the number plane: \(2x - 3y < 12\)

9. Solve and graph on the number line: \(|3 - 5x| = 2\)
10. Solve and graph on the number line: \(|1 - 2x| \geq 7\)

ANSWERS TOPIC 3: Linear Equations and Inequalities
1. \(x = \frac{3}{2}\)

2. (-6, -11); The lines are intersecting but not perpendicular.

3. When you solve this system, you will get an equation that is true always; such as 0=0 or something similar. Thus, the solution to this system has an infinite number of ordered pairs (i.e. all real numbers); The lines are the same line.

4. Slope = 3/2; y-intercept = (0, -3)

5. \(y = \frac{3}{5}x - \frac{16}{5}\)

6. \(x = -2\)
7. \( x \geq -3 \)

8. Diagram showing a shaded region on the coordinate plane.

9. Answer: \( x = \frac{1}{5} \) or \( x = 1 \)

10. Answer: \( x \leq -3 \) or \( x \geq 4 \)

For more examples, click here.