Show all your work to get full/partial credit. Each problem is worth 5 points.

1. Graph \( y = 2x + 1 \).

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Given \(-2x + 4y = 12\), graph
   a. The x-intercept. [5 points]
      \[ -2x = 12 \]
      \[ x = -6 \]
      \[ (-6, 6) \]
   b. The y-intercept. [5 points]
      \[ 4y = 12 \]
      \[ y = 3 \]
      \[ (0, 3) \]

3. Determine the center and radius of the circle: \((x - 4)^2 + (y + 2)^2 = 81\)

   Center: \((4, -2)\)
   Radius: \(\sqrt{81} = 9\)
4. Check if the given relation defines y as a function of x, explain your reasons.

No, does not pass VCT.

5. Solve \( x^2 + 4x - 8 = 0 \) using completing the square.

\[
\begin{align*}
\text{Given: } & \quad x^2 + 4x = 8 \\
\text{Add 4 to both sides: } & \quad x^2 + 4x + 4 = 8 + 4 \\
\text{Complete the square: } & \quad (x + 2)^2 = 12 \\
\text{Solve for } x: & \quad x + 2 = \pm \sqrt{12} \\
\text{Solution: } & \quad x = -2 \pm 2\sqrt{3}
\end{align*}
\]

6. If set \( A = \{ x \mid x \leq 6 \} \) and set \( B = \{ x \mid x \geq -1 \} \), find \( A \cap B \)

\[ \{ x \mid -1 \leq x \leq 6 \} \]

7. a. Write an equation that indicates that the area is 250yd^2. [5 points]

\[ \text{length} \cdot (x + 15) = 250 \]

b. Find the length and the width of the rectangle. [5 points]

\[ x^2 + 15x - 250 = 0 \]

\[ (x + 25)(x - 10) = 0 \]

\( \Rightarrow \quad x = 10 \)

\( \Rightarrow \quad \text{Length} = 25 \; ; \; \text{Width} = 10 \)
8. a. Solve \( x + \frac{6x+30}{x^2-25} = 0 \). [5 points]

\[
\frac{x + 6(x+5)}{(x+5)(x-5)} = \frac{x(x-5)}{(x-5)} + \frac{6}{x-5} = \frac{x^2 - 5x + 6}{x-5} = 0
\]

\( \therefore x^2 - 5x + 6 = 0 \Rightarrow (x-6)(x+1) = 0 \Rightarrow \boxed{x = 6, -1} \)

b. Find restrictions on the function, if any. [5 points]

\( x \neq 5; \ x \neq -5 \)

9. Solve the equation: \( \sqrt{2x-4} = 6 \).

\( 2x - 4 = 36 \)
\( 2x = 40 \)
\( x = 20 \)

10. Solve \( 2x - 9 < 6(x - 1) - 3x \).

\( 2x - 9 < 6x - 6 - 3x \)
\( 2x - 9 < 3x - 6 \)
\( -3 < x \)

11. Given \( -2 \leq \frac{4x-1}{3} \leq 5 \).

a. Solve the compound inequality. [5 points]

\( -2(3) \leq 4x - 1 \leq 5(3) \)
\( -5 \leq 4x \leq 16 \)
\( -\frac{5}{4} \leq x \leq 4 \)

b. Write the solution set in interval notation and graph. [5 points]
12. Solve the equation: \( |3x + 5| = |x + 1| \).

\[
3x + 5 = x + 1 \quad \text{or} \quad 3x + 5 = -(x + 1)
\]

\[
2x = -4 \quad \text{or} \quad 4x = -6
\]

\[
x = -2 \quad \text{or} \quad x = -\frac{3}{2}
\]

13. Solve \( |x - 3| \leq 4 \).

\[
-4 \leq x - 3 \leq 4
\]

\[
-1 \leq x \leq 7
\]

14. Solve \( 2|x + 3| - 4 \geq 6 \).

\[
2|x + 3| \geq 10
\]

\[
|x + 3| \geq 5
\]

\[
x + 3 \geq 5 \quad \text{or} \quad x + 3 \leq -5
\]

\[
x \geq 2 \quad \text{or} \quad x \leq -8
\]

15. Find the midpoint of the line segment whose endpoints are: (-1,-3) and (3,-7).

\[
\left( \frac{-1 + 3}{2}, \frac{-3 + (-7)}{2} \right) = \left( \frac{2}{2}, \frac{-10}{2} \right) = \left( 1, -5 \right)
\]

16. Find the distance between the points: (1,1) and (2,3).

\[
\sqrt{(1 - 2)^2 + (1 - 3)^2} = \sqrt{1 + 4} = \sqrt{5}
\]