For the following problems use the given points (2, -5) and (-1, 4).

1. Find the distance between the two points.
\[ \sqrt{(-1 - 2)^2 + (-5 + 4)^2} = \sqrt{(-3)^2 + 1^2} = \sqrt{9 + 1} = \sqrt{10} = \sqrt{5} \cdot \sqrt{2} \]
Answer: \(3\sqrt{10}\)

2. Find the midpoint of the line segment joining the two points.
\[ \left( \frac{2 + (-1)}{2}, \frac{-5 + 4}{2} \right) \]
Answer: \(\left( \frac{1}{2}, -\frac{1}{2} \right)\)

3. Write an equation for the line through the two points, in slope-intercept form.
\[ m = \frac{4 + 5}{-1 - 2} = \frac{9}{-3} = -3 \]
\[ y + 5 = -3(x - 2) \]
\[ y + 5 = -3x + 6 \]
I'll use (2, -5) as a point.
Answer: \(y = -3x + 1\)

4. Write an equation for the line parallel to \(3x - 5y = 8\) but through the point (1, 5). (Final answer in slope-intercept form)
Find slope of old line:
\[ \frac{3x - 5y = 8}{-5y = -3x + 8} \]
\[ y = \frac{3}{5}x - \frac{8}{5} \]
\[ (1, 5) \]
\[ y - 5 = \frac{3}{5}x - \frac{3}{5} \]
\[ y = \frac{3}{5}x + \frac{22}{5} \]
Answer: \(y = \frac{3}{5}x + \frac{22}{5}\)

5. Write an equation in slope-intercept form for the line perpendicular to \(y = 3x - 5\) but through the point (-2, 6).
\[ m = -\frac{1}{3} \]
\[ y - 6 = -\frac{1}{3}(x + 2) \]
\[ y = -\frac{1}{3}x - \frac{2}{3} \]
Answer: \(y = -\frac{1}{3}x + \frac{16}{3}\)

6. Find the x and y-intercepts of the equation \(8x + 3y - 15 = 0\).
\[ 8x + 3y = 15 \]
Let \(x = 0\) \n\[ 3y = 15 \]
\[ y = 5 \]
Let \(y = 0\) \n\[ 8x = 15 \]
\[ x = \frac{15}{8} \]
Answer: \((0, 5)\) \(\left( \frac{15}{8}, 0 \right)\)

7. Write an equation for the vertical line through (2, -6).
Answer: \(x = 2\)

8. Write an equation for the horizontal line through (3, 1)
Answer: \(y = 1\)
9. Write in standard form the equation of the circle. Indicate the center and radius, then sketch its graph.
\[4x^2 + 4y^2 + 24x - 40y + 120 = 0\]
\[x^2 + y^2 + 6x - 10y + 30 = 0\]
\[x^2 + 6x + 9 + y^2 - 10y + 25 = -30 + 9 + 25\]
Standard form \((x+3)^2 + (y-5)^2 = 4\)
Center \((-3, 5)\) Radius \(2\)

10. Sketch the graph of each of the following equations.
A. \(3x + 7y = 21\)

\[\text{Hint: start with x-int at (0,3)}\]
\[\text{Then go up 4 right 1 for next point}\]

C. \((x + 2)^2 + (y - 1)^2 = 9\)

\[\text{Hint: center (-2, 1), r = 3}\]

11. Find the domain of each of the following functions.
A. \(g(x) = \frac{x + 5}{x^2 - 6x - 7}\)
\[x^2 - 6x - 7 = 0\]
\[(x - 7)(x + 1) = 0\]
\[x = 7, x = -1\]
Answer \(x = 7, x = -1\)

B. \(f(x) = \sqrt{3 - 2x}\)
\[3 - 2x \geq 0\]
\[-2x \geq -3\]
\[x \leq \frac{3}{2}\]
Answer \(x \leq \frac{3}{2}\) or you could answer \((-\infty, \frac{3}{2}]\)

12. Given the function \(f(x) = 2x^2 - 4x\) find
A. \(f(-3)\)
\[2(-3)^2 - 4(-3) = 2(9) + 12 = 18 + 12\]
Answer \(30\)

B. \(f(4)\)
\[2(4)^2 - 4(4) = 2(16) - 16 = 32 - 16\]
Answer \(16\)
13. Consider the relation \{(3,2), (3,6), (4, 8)\}. Is it a function? Yes or No (circle one)

Give the domain \{3, 2, 6\}

and range \{2, 4, 8\}

14. Acme Car Sales pays its sales staff $30,000, plus $500 per car they sell. Find an equation that relates the salary, S, per month to x, the number of cars sold.

Answer \[ S = 30000 + 500x \]