

Name: _____

Solutions

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No aids (calculator, notes, text, etc.) are permitted. Show all work for full credit and box your final answer.

1. [2 points]

- a. Complete the statement: Two nonvertical lines with slopes m_1 and m_2 are **parallel** if and only if

$$m_1 = m_2$$

- b. Complete the statement: Two nonvertical lines with slopes m_1 and m_2 are **perpendicular** if and only if

$$m_1 = -\frac{1}{m_2} \quad \text{or} \quad m_2 = -\frac{1}{m_1} \quad \text{or} \quad m_1 m_2 = -1$$

2. [4 points]

- a. Find the equation, in **slope-intercept form**, for the line **parallel** to the given line $6x + 2y = 19$ and passing through the point $(-6, -13)$.

$$y = mx + b$$

$$m = -3$$

$$y = -3x + b$$

$$-13 = -3 \cdot (-6) + b$$

$$-13 = 18 + b$$

$$b = -31$$

$$2y = 19 - 6x$$

$$y = -3x + \frac{19}{2}$$

$$\boxed{y = -3x - 31}$$

- b. Determine if two lines $x - 5y = 2$ and $5x - y = 2$ are **perpendicular**.

$$5y = x - 2$$

$$y = \frac{1}{5}x - \frac{2}{5}$$

$$y = 5x - 2$$

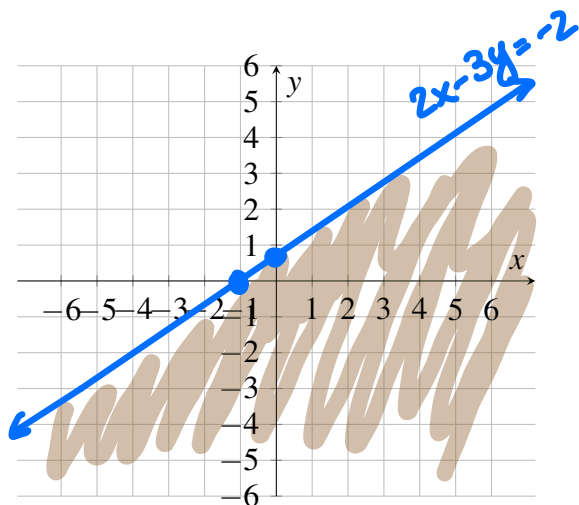
$$m_1 = \frac{1}{5} \quad m_2 = 5$$

$$m_1 m_2 \neq -1$$

Not perpendicular

3. [2 points] Graph the solution set that satisfies the following inequalities:

$$2x - 3y \geq -2$$

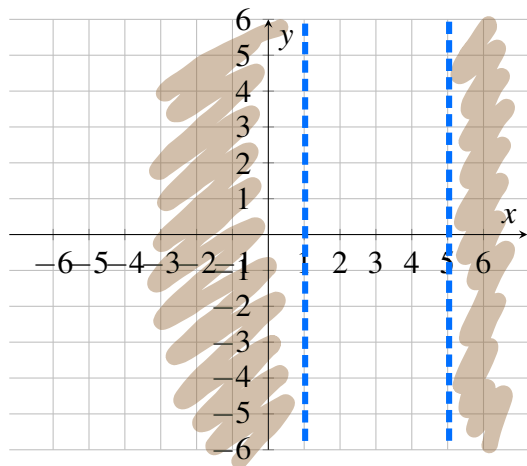


$$2x - 3y = -2$$

x	y
0	$\frac{2}{3}$
-1	0

4. [2 points] Graph the solution set that satisfies the following absolute value inequality:

$$|x - 3| > 2$$



$$\begin{aligned} x - 3 > 2 & \text{ "or" } x - 3 < -2 \\ x > 5 & \text{ "or" } x < 1 \end{aligned}$$

5. [2 points]

- a. Determine if the relation $R = \{(-2, 5), (2, 4), (-2, 3), (3, -9)\}$ is a function. **Fully** explain your answer (you may use a Vertical Line Test).

R is not a function since for $x = -2$ we have $y_1 = 5$ and $y_2 = 3$.

- b. Determine if the relation $y = 2x + 1$ is a function. **Fully** explain your answer (you may use a Vertical Line Test).

$y = 2x + 1$ is a straight line which is not $x = a$. Thus, $y = 2x + 1$ is a function.

6. [4 points] You are given a function

$$f: \mathbb{Z} \rightarrow \mathbb{Z} \text{ by } f(x) = 3x$$

Find:

- (a) Domain of f :

$$\text{Dom}(f) = \mathbb{Z}$$

- (b) Codomain of f :

$$\text{Codomain}(f) = \mathbb{Z}$$

- (c) Range of f :

$$\text{Ran}(f) = \{\dots, -9, -6, -3, 0, 3, 6, 9, 12, \dots\}$$

7. [Extra Credit, 4 points] Use the graph of the function f to answer the following questions:

- $f(0) = 0$
- $f(3) = 18$
- $f(-1) = 2$

