

$$\textcircled{1} \quad 5x - 2y = 2$$

$$-2y = -5x + 2$$

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

$$m = \frac{5}{2}$$

$$m_{\perp} = -\frac{2}{5}$$

$$y + 6 = -\frac{2}{5}(x + 2)$$

$$y + 6 = -\frac{2}{5}x - \frac{4}{5}$$

$$y = -\frac{2}{5}x - \frac{34}{5}$$

$$\left( y + \frac{2}{5}x = -\frac{34}{5} \right)$$

$$5y + 2x = -34$$

Name: \_\_\_\_\_ Date: \_\_\_\_\_

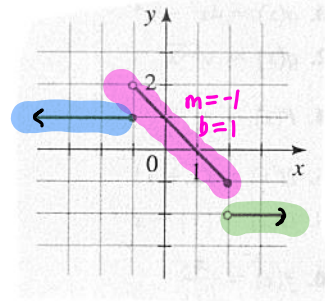
PC: Algebraic Definition of Absolute Value

Ms. Loughran

**Do Now:**

- Write an equation, in standard form, that is perpendicular to the line  $5x - 2y = 2$  and that passes through the point  $(-2, -6)$ .
- Write equations for the piecewise function whose graph is show:

$$f(x) = \begin{cases} 1 & x \leq -1 \\ -x + 1 & -1 < x \leq 2 \\ -2 & x > 2 \end{cases}$$



**Algebraic definition of Absolute Value:**

For any real number  $x$ ,

in general

$$|\text{stuff}| =$$

$$\begin{cases} \text{stuff} & \text{stuff} \geq 0 \\ -\text{stuff} & \text{stuff} < 0 \end{cases}$$

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

Use the algebraic definition of absolute value to rewrite each expression and then sketch the graph on a separate piece of paper.

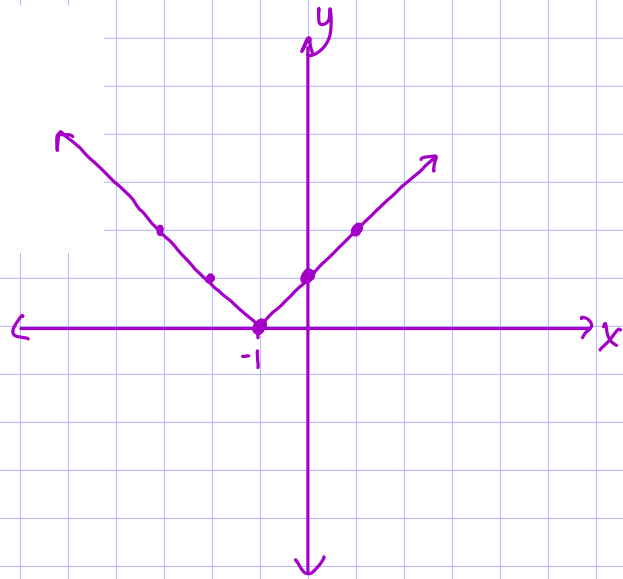
$$1. |x+1| = \begin{cases} x+1 & x+1 \geq 0, x \geq -1 \\ -(x+1) & x+1 < 0, x < -1 \end{cases}$$

$$2. |x-3| =$$

1.  $|x+1| =$

$$\begin{cases} x+1 & x+1 \geq 0, x \geq -1 \\ -(x+1) & x+1 < 0, x < -1 \\ -x-1 & \end{cases}$$

D:  $(-\infty, \infty)$   
R:  $[0, \infty)$

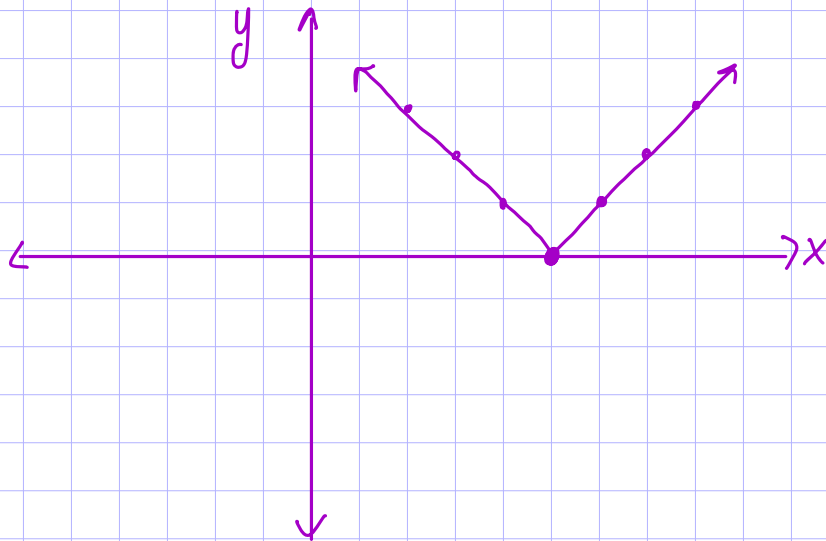


3.  $|5-x| =$

$$|x-5| = \begin{cases} x-5 & x-5 \geq 0, x \geq 5 \\ -(x-5) & x < 5 \\ -x+5 & \end{cases}$$

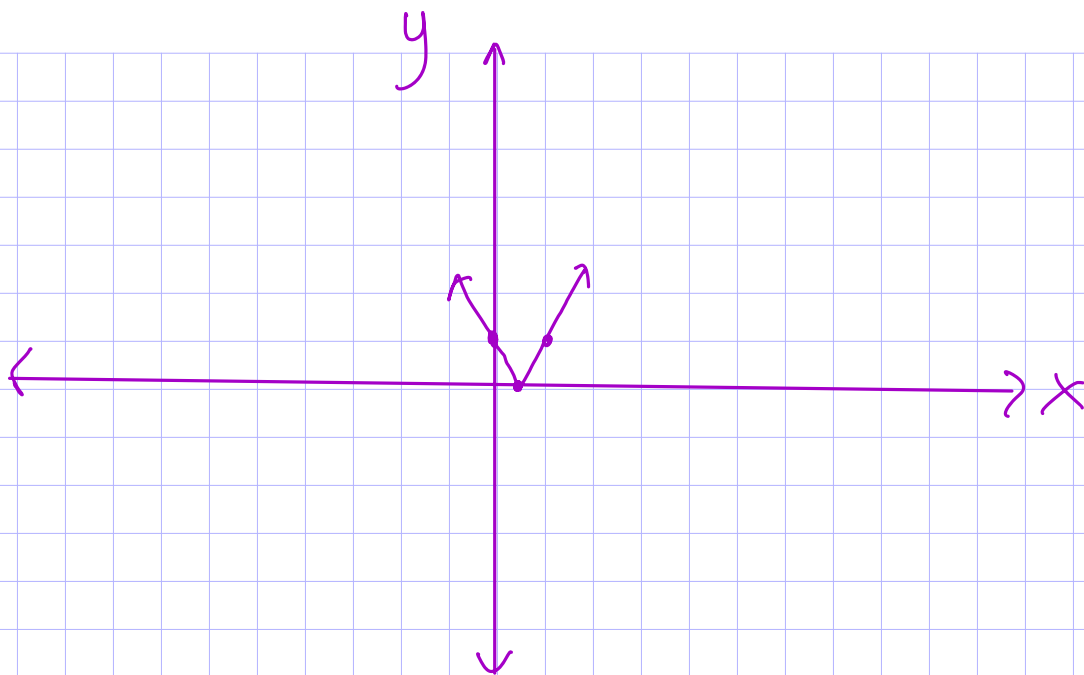
$|x|$   
moved  
right 5

D:  $(-\infty, \infty)$   
R:  $[0, \infty)$

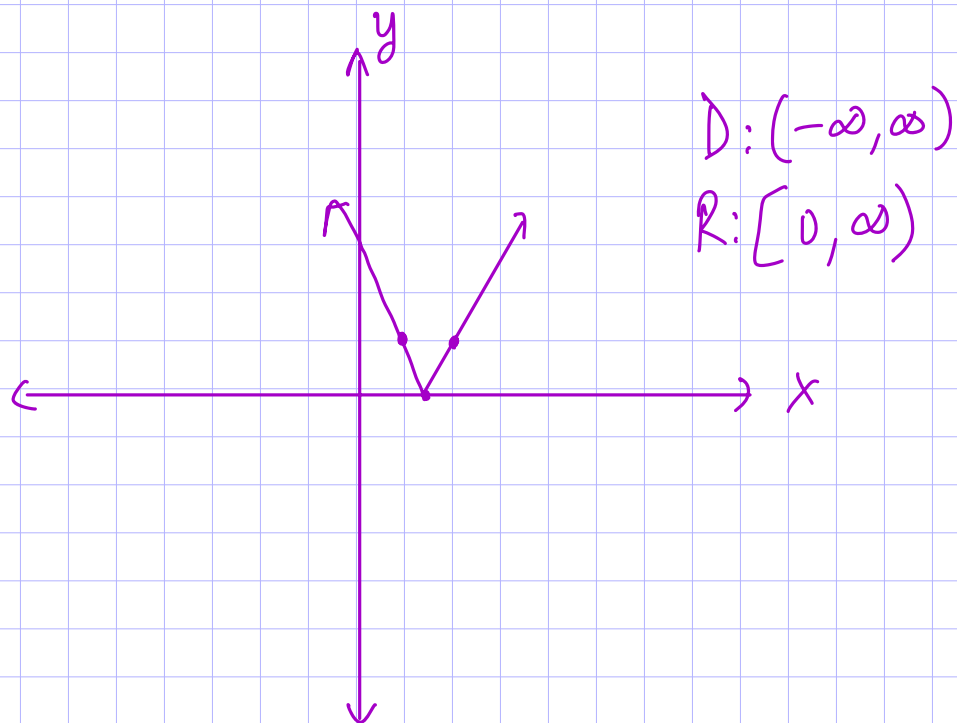


5.  $|2x-1| =$

$$\begin{cases} 2x-1 & 2x-1 \geq 0, x \geq \frac{1}{2} \\ -(2x-1) & x < \frac{1}{2} \\ -2x+1 & \end{cases}$$



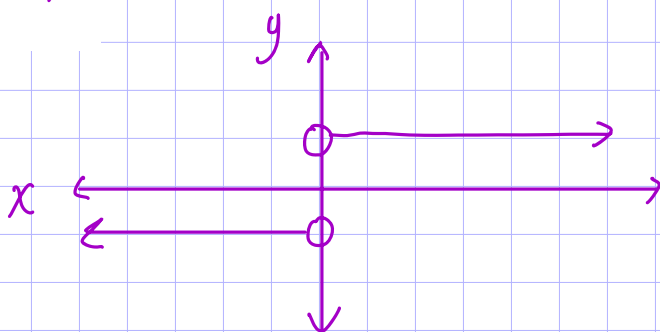
$$7. |3 - 2x| = |2x - 3| = \begin{cases} 2x - 3 & 2x - 3 \geq 0, \quad x \geq \frac{3}{2} \\ -2x + 3 & x < \frac{3}{2} \end{cases}$$



9.  $\frac{|x|}{x} =$

$$\begin{cases} \frac{x}{x} = 1 & x > 0 \\ \frac{-x}{x} = -1 & x < 0 \end{cases}$$

\*  $x \neq 0$  here b/c it would cause  $\frac{|x|}{x}$  to be undefined



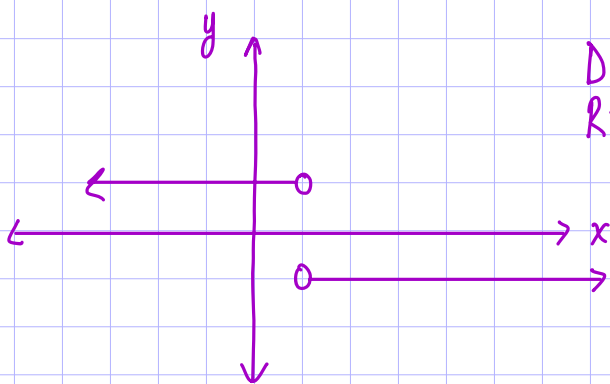
$$\{x | x \in \mathbb{R} / 0\}$$

$$D: (-\infty, 0) \cup (0, \infty)$$

$$R: \{\pm 1\}$$

11.  $\frac{|x-1|}{1-x} =$

$$\begin{cases} \frac{x-1}{1-x} = -1 & x-1 > 0, x > 1 \\ -\frac{(x-1)}{1-x} = 1 & x < 1 \end{cases}$$



$$D: (-\infty, 1) \cup (1, \infty)$$

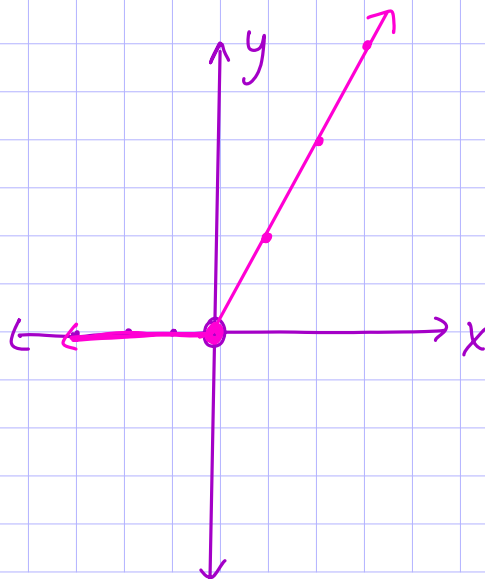
$$R: \{\pm 1\}$$

13.  $|x| + x =$

$$\begin{cases} x + x = 2x & x \geq 0 \\ -x + x = 0 & x < 0 \end{cases}$$

$$D: (-\infty, \infty)$$

$$R: [0, \infty)$$



# Homework 11-09

Name: Key  
 PC: Review of Piecewise Functions

Date: \_\_\_\_\_  
 Ms. Loughran

For 1-12, evaluate the function for the given value of  $x$ .

$$f(x) = \begin{cases} 3, & \text{if } x \leq 0 \\ 2, & \text{if } x > 0 \end{cases}$$

$$g(x) = \begin{cases} x + 5, & \text{if } x \leq 3 \\ 2x - 1, & \text{if } x > 3 \end{cases}$$

$$h(x) = \begin{cases} \frac{1}{2}x - 4, & \text{if } x \leq -2 \\ 3 - 2x, & \text{if } x > -2 \end{cases}$$

1.  $f(2)$     2

2.  $f(-4)$

3.  $f(0)$     3

4.  $f\left(\frac{1}{2}\right)$

5.  $g(7)$     13

6.  $g(0)$

7.  $g(-1)$     4

8.  $g(3)$

9.  $h(-4)$     -6

10.  $h(-2)$

11.  $h(-1)$     5

12.  $h(6)$

For 13-18, match the piecewise function with its graph.

E 13.  $f(x) = \begin{cases} x - 4, & \text{if } x \leq 1 \\ 3x, & \text{if } x > 1 \end{cases}$

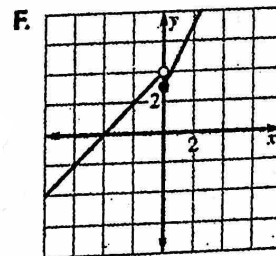
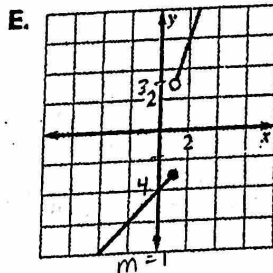
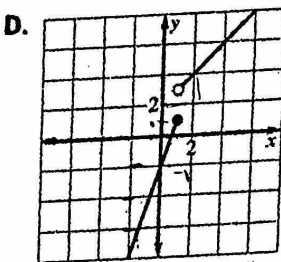
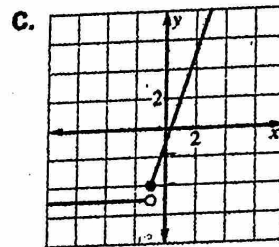
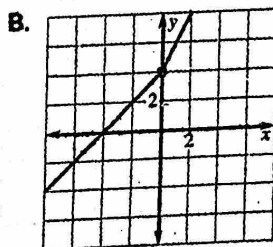
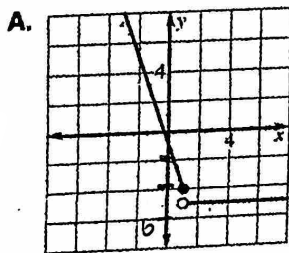
14.  $f(x) = \begin{cases} x + 4, & \text{if } x \leq 0 \\ 2x + 4, & \text{if } x > 0 \end{cases}$

15.  $f(x) = \begin{cases} 3x - 2, & \text{if } x \leq 1 \\ x + 2, & \text{if } x > 1 \end{cases}$     D

16.  $f(x) = \begin{cases} 2x + 3, & \text{if } x \geq 0 \\ x + 4, & \text{if } x < 0 \end{cases}$

17.  $f(x) = \begin{cases} 3x - 1, & \text{if } x \geq -1 \\ -5, & \text{if } x < -1 \end{cases}$     C

18.  $f(x) = \begin{cases} -3x - 1, & \text{if } x \leq 1 \\ -5, & \text{if } x > 1 \end{cases}$



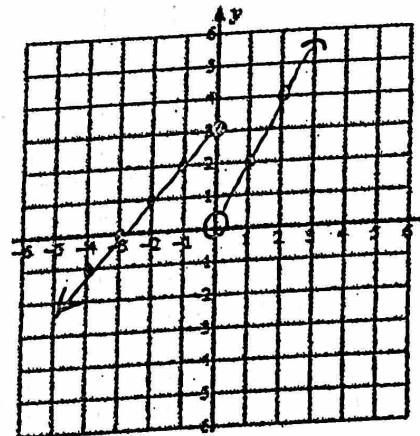
Scale  
Boxes are  
2 units

15

$3x - 2$

For 19-21, graph the function.  
 19.

$$f(x) = \begin{cases} x + 3, & \text{if } x \leq 0 \\ 2x, & \text{if } x > 0 \end{cases}$$



D:  $(-\infty, \infty)$

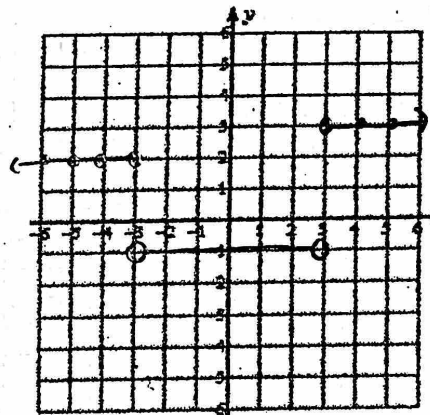
R:  $(-\infty, \infty)$

21.

$$f(x) = \begin{cases} 2, & \text{if } x \leq -3 \\ -1, & \text{if } -3 < x < 3 \\ 3, & \text{if } x \geq 3 \end{cases}$$

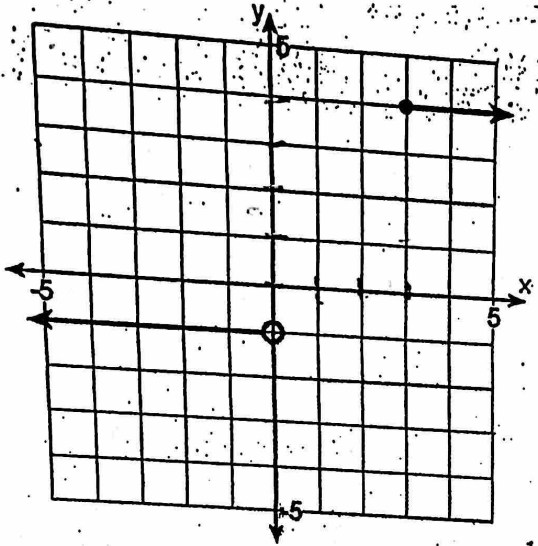
$$D: (-\infty, \infty)$$

$$R: \{-1, 2, 3\}$$



For 22-28, write functions for each of the following piecewise graphs.

23.

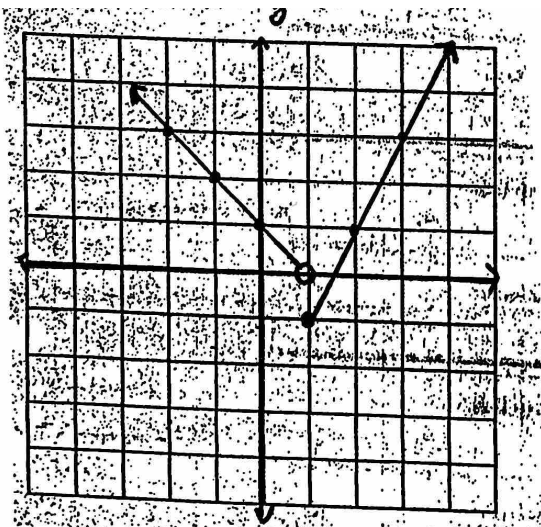


$$f(x) = \begin{cases} -1 & x < 0 \\ 4 & x \geq 3 \end{cases}$$

$$D: (-\infty, 0) \cup [3, \infty)$$

$$R: \{-1, 4\}$$

25

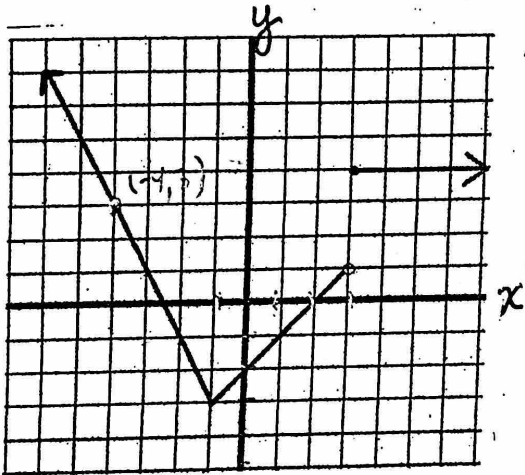


$$f(x) = \begin{cases} -x + 1 & x < 1 \\ 2x - 3 & x \geq 1 \end{cases}$$

$$D: (-\infty, \infty)$$

$$R: [-1, \infty)$$

27.



$$y - 3 = -2(x + 4)$$

$$y - 3 = -2x - 8$$

$$y - 3 = -2x - 5$$

$$f(x) = \begin{cases} -2x - 5 & x < -1 \\ x - 2 & -1 \leq x < 3 \\ 4 & x \geq 3 \end{cases}$$

$$D: (-\infty, \infty)$$

$$R: [-3, \infty)$$