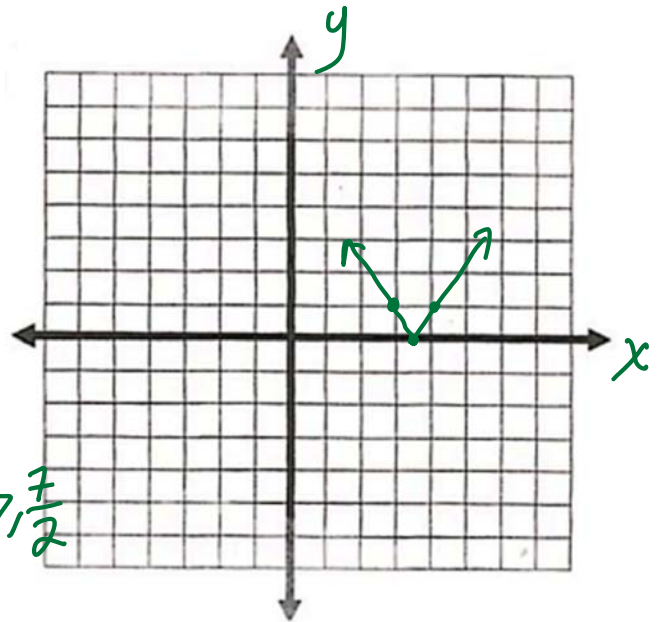Do Now:

Use the algebraic definition of absolute value to write the following as a piecewise function. Then graph it and find its domain and range.

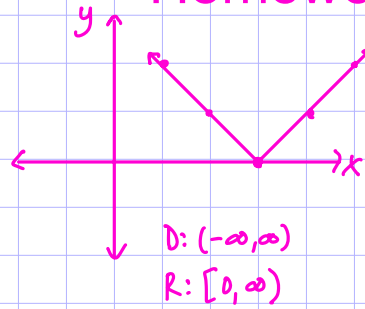$$|7-2x| = |2x-7|$$

$$|2x-7|$$

$$|2x-7| = \begin{cases} 2x-7 & \text{if } 2x-7 \geq 0, x \geq \frac{7}{2} \\ -(2x-7) & \text{if } x < \frac{7}{2} \end{cases}$$
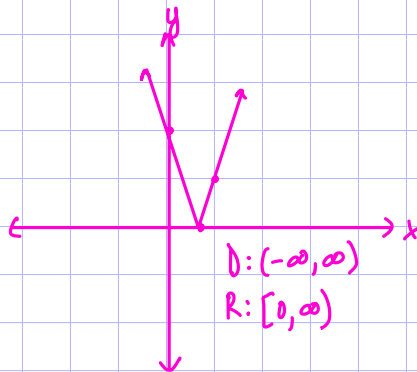
D: $(-\infty, \infty)$
R: $[0, \infty)$

Work on the Algebraic Definition of Absolute Value Matching Activity. When you are finished, please bring it to me to be checked. Then work on the evens from the Review of Piecewise Functions packet.
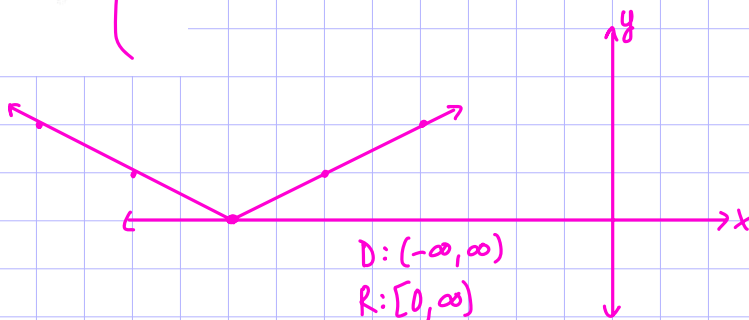
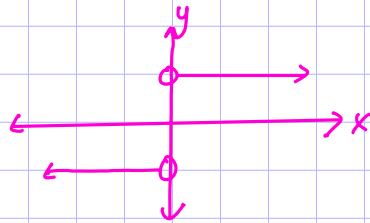2. $|x-3| = \begin{cases} x-3 & \text{if } x-3 \geq 0, \; x \geq 3 \\ -(x-3) & \text{if } x < 3 \end{cases}$

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

4. $|3x-2| = \begin{cases} 3x-2 & \text{if } 3x-2 \geq 0, \; x \geq \frac{2}{3} \\ -(3x-2) & \text{if } x < \frac{2}{3} \end{cases}$

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

6. $\left|\frac{1}{2}x+4\right| = \begin{cases} \frac{1}{2}x+4 & \text{if } \frac{1}{2}x+4 \geq 0 \quad x \geq -8 \\ -\left(\frac{1}{2}x+4\right) & \text{if } x < -8 \end{cases}$
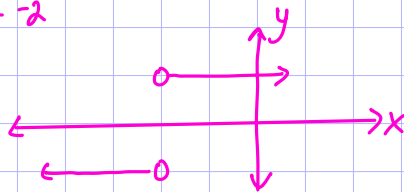
D: $(-\infty, \infty)$
R: $[0, \infty)$

8. $\dfrac{x}{|x|} =$ $\dfrac{x}{x} = 1$ if $x > 0$

$\dfrac{x}{-x} = -1$ if $x < 0$

D: $(-\infty, 0) \cup (0, \infty)$
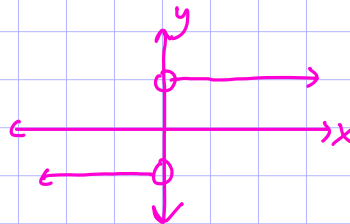R: $\{\pm 1\}$

10. $\dfrac{|x+2|}{x+2} = \begin{cases} \dfrac{x+2}{x+2} = 1 & \text{if } x+2 > 0, \ x > -2 \\[2mm] \dfrac{-(x+2)}{x+2} = -1 & \text{if } x < -2 \end{cases}$

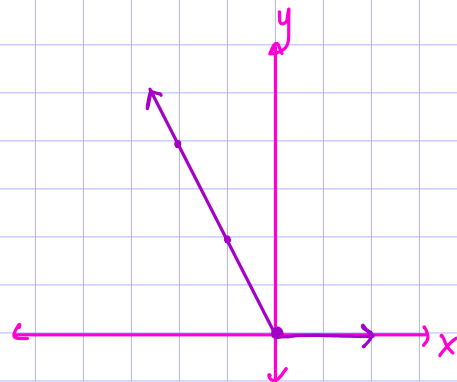D: $(-\infty, -2) \cup (-2, \infty)$
R: $\{\pm 1\}$

12. $\dfrac{|2x|}{2x} = \begin{cases} \dfrac{2x}{2x} = 1 & \text{if } 2x > 0, \ x > 0 \\[2mm] \dfrac{-2x}{2x} = -1 & \text{if } x < 0 \end{cases}$

D: $(-\infty, 0) \cup (0, \infty)$
R: $\{\pm 1\}$

14. $|x| - x = \begin{cases} x - x = 0 & \text{if } x \geq 0 \\[2mm] -x - x = -2x & \text{if } x < 0 \end{cases}$

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

Matching Activity Answers

$$f(x) = \begin{cases} -2x-4 & \text{if } x > -2 \\ 2x+4 & \text{if } x \le -2 \end{cases}$$

L

$$f(x) = \begin{cases} 2x-10 & \text{if } x > 5 \\ -2x+10 & \text{if } x \le 5 \end{cases}$$

C

$$f(x) = \begin{cases} 2x+5 & \text{if } x > 0 \\ -2x+5 & \text{if } x \le 0 \end{cases}$$

B

$$f(x) = \begin{cases} x & \text{if } x > 0 \\ -x & \text{if } x \le 0 \end{cases}$$

A

$$f(x) = \begin{cases} -x+2 & \text{if } x > 2 \\ x-2 & \text{if } x \le 2 \end{cases}$$

J

$$f(x) = \begin{cases} 2x-5 & \text{if } x > 2.5 \\ -2x+5 & \text{if } x \le 2.5 \end{cases}$$

D

$$f(x) = \begin{cases} x+2 & \text{if } x > -2 \\ -x-2 & \text{if } x \le -2 \end{cases}$$

I

$$f(x) = \begin{cases} -3x & \text{if } x > 0 \\ 3x & \text{if } x \le 0 \end{cases}$$

K

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

H

$$f(x) = \begin{cases} -x & \text{if } x > 0 \\ x & \text{if } x \le 0 \end{cases}$$

G

$$f(x) = \begin{cases} x-2 & \text{if } x > 2 \\ -x+2 & \text{if } x \le 2 \end{cases}$$

F

$$f(x) = \begin{cases} 2x & \text{if } x > 0 \\ -2x & \text{if } x \le 0 \end{cases}$$

E