

Day 4: Piecewise Functions

Date _____

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Piecewise Functions

1) Functions that change for different domains are called piecewise.

2) To find the value of a piecewise function for a given x -value, first determine which

domain x belongs to, this means you have to look at the domain for each piece, and find the one that applies to the given x value.

For example, for the piecewise, $f(x) = \begin{cases} x+1, & x < 0 \\ x^2, & x \geq 0 \end{cases}$

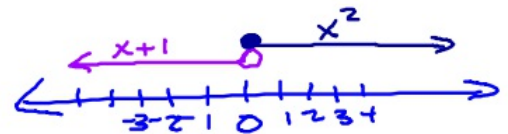
Find $f(2)$

What does $f(2)$ mean? x^2 domain

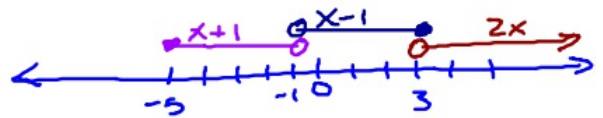
Determine which equation to use:

How do you know?

Now plug 2 in for x and solve



Given $f(x) = \begin{cases} x+1, & -5 \leq x < -1 \\ x-1, & -1 < x \leq 3 \\ 2x, & x > 3 \end{cases}$, find the following.



$$3) f(-4) = -4 + 1 \\ = -3$$

$$4) f(0) = 0 - 1 \\ = -1$$

$$f(-1) = \emptyset$$

$$5) f(3) = 3 - 1 \\ = 2$$

$$6) f(18) = 2(18) \\ = 36$$

$$7) f(1) = 1 - 1 \\ = 0$$

$$8) f(-20) = \text{empty set} \\ = \text{null set} \\ = \emptyset$$

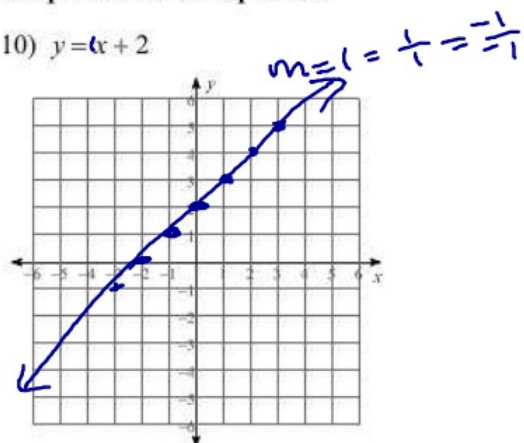
9) Before we begin with graphing a piecewise function, let's review how to graph a linear equation in the form of $y = mx + b$.

m represents the slope which is $\frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}}$.

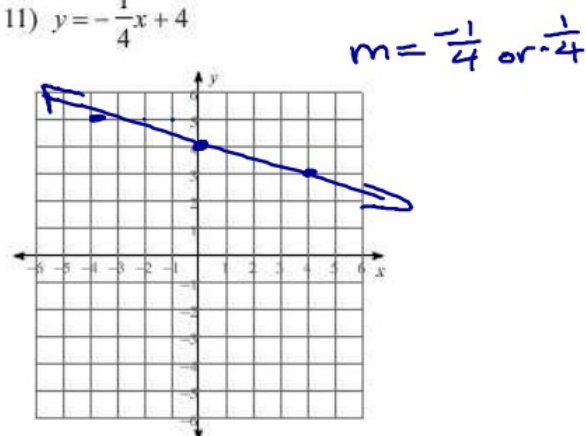
b represents the y-int. and this is your Starting point.

Graph each linear equation.

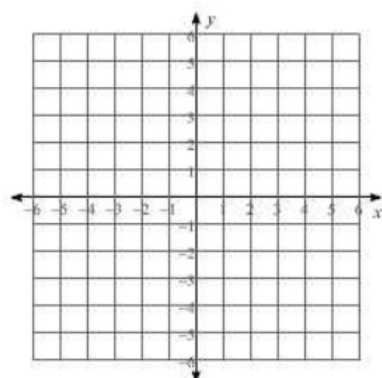
10) $y = x + 2$



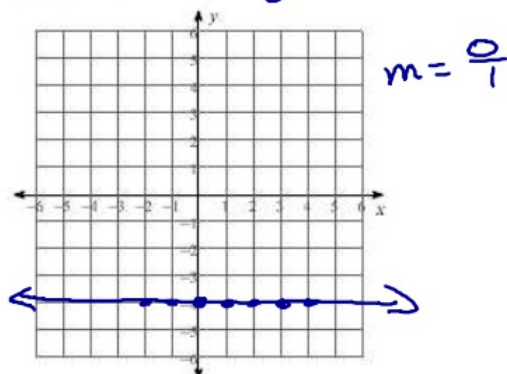
11) $y = -\frac{1}{4}x + 4$



12) $y = \frac{3}{4}x + 2$

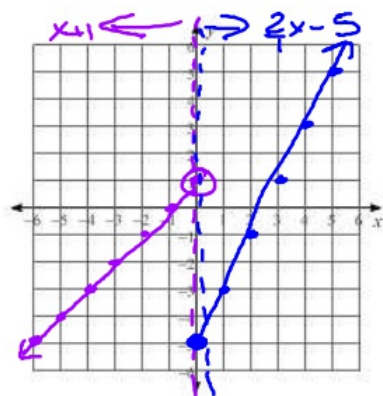


13) $y = -4 \Rightarrow y = 0x - 4$

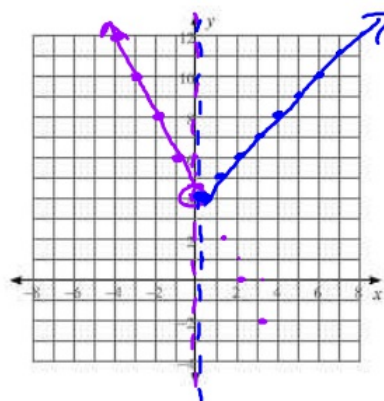


Graph the following piecewise functions.

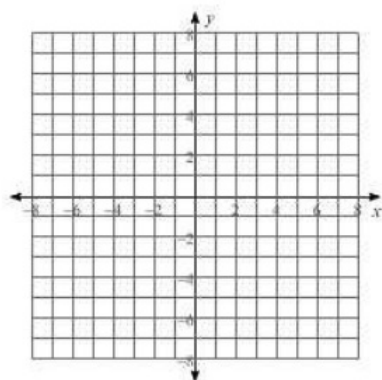
$$14) f(x) = \begin{cases} x+1, & x < 0 \\ 2x-5, & x \geq 0 \end{cases}$$



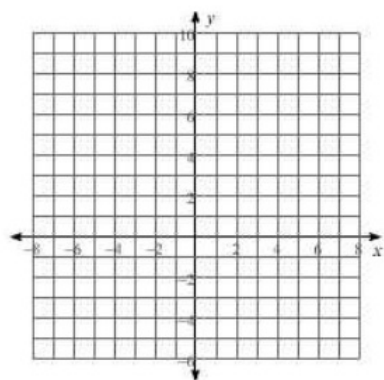
$$15) f(x) = \begin{cases} -\frac{2}{3}x + 4, & x < 0 \\ x + 4, & x \geq 0 \end{cases} \quad m = -\frac{2}{3} \text{ or } \frac{2}{3}$$



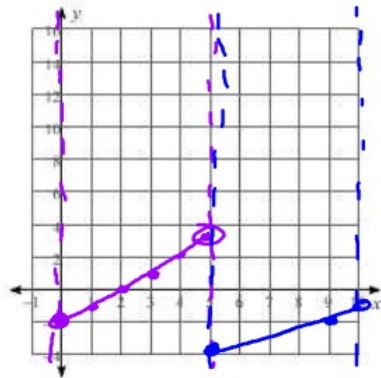
$$16) f(x) = \begin{cases} 3x - 4, & x < 0 \\ \frac{1}{2}x + 3, & x \geq 0 \end{cases}$$



$$17) f(x) = \begin{cases} -x + 3, & x < 0 \\ x - 2, & x \geq 0 \end{cases}$$



$$18) f(x) = \begin{cases} x-2, & 0 \leq x < 5 \\ 2x-4, & 5 \leq x < 10 \end{cases}$$

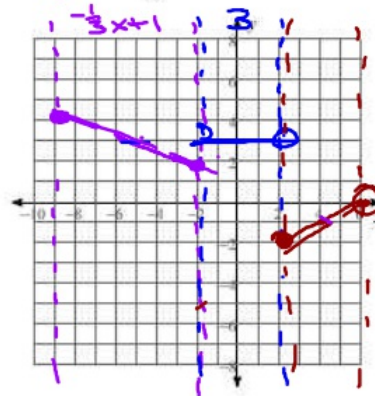


$$19) f(x) = \begin{cases} -\frac{1}{3}x+1, & -9 \leq x \leq -2 \\ 3, & -2 < x < 2 \\ \frac{1}{2}x-3, & 2 \leq x < 6 \end{cases}$$

$$y = -\frac{1}{3}x + 1$$

$$y = 3$$

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



$$20) f(x) = \begin{cases} \frac{2}{3}x+2, & x \leq -2 \\ -2, & -2 < x < 5 \\ \frac{1}{2}x-1, & x \geq 5 \end{cases}$$

