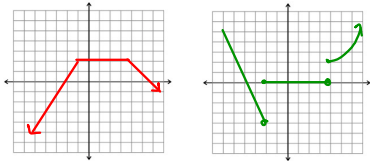


Piecewise Function: A function whose definition changes depending on the value of the independent variable.

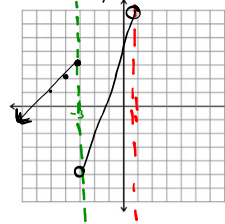
Recall: A function must pass the vertical line test (meaning two points cannot intersect a given vertical line at any point of the graph)

Example of what piecewise might look like:



Graph the piecewise function by (1) Evaluating the given endpoints from the intervals and (2) determine whether to graph each with an open circle, closed circle, or arrow.

$$f(x) = \begin{cases} x+6 & x \leq -3 \\ 3x+4 & -3 < x < 1 \end{cases}$$



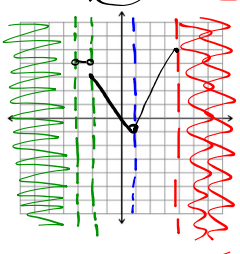
$$\begin{aligned} -3+6 &= 3 \\ 3(-3)+4 & \\ -9+4 &= -5 \\ 3(1)+4 & \\ 3+4 &= 7 \end{aligned}$$

Graph

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

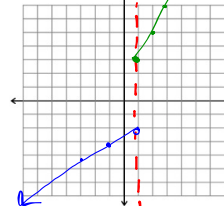
single # is a horizontal line

$$\begin{aligned} -(-3) &= 3 \\ -(1) &= -1 \\ 2(1)-3 & \\ 2-3 &= -1 \\ 2(4)-3 & \\ 8-3 &= 5 \end{aligned}$$



You Try:

+ up
- down



$$\begin{aligned} 2(1)+1 & \\ 2+1 &= 3 \\ \frac{1}{2} - \frac{6}{2} &= \frac{-5}{2} \\ \text{yes} \\ f(-2) &= \frac{-2}{2} - 3 = -1 - 3 = -4 \\ f(2) &= 2(2)+1 = 4+1 = 5 \\ f(1) &= 3 \end{aligned}$$

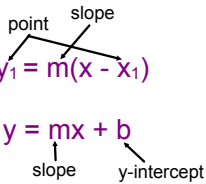
Remember:

$$\text{slope} = m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Equations of a line:

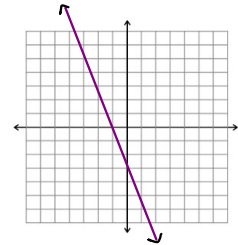
point-slope form: $y - y_1 = m(x - x_1)$

slope-intercept form: $y = mx + b$



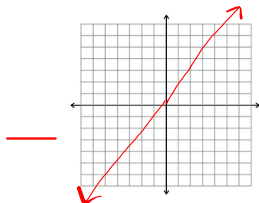
Find the equation of the line given the graph/
points:

(2, 4) and (6, -8)



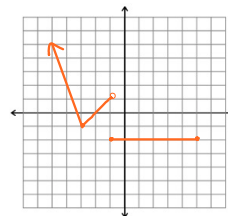
Working Backwards!

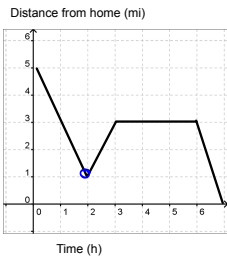
1. Find the equation of each line (segment)
2. Determine the domain of each piece (don't forget to watch for open circles < > or closed circles ≤)
3. Write as a piecewise function



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

Write the equation for the piecewise function:





1. What is happening at time=2 h?
2. What is happening from time=0 h until time=2 h? What is the slope of this line?
3. What is happening from time=2 h until time=3 h? What is the slope of this line?

4. What is happening from time=3h to time=6h? What is the slope of this line?

5. What is happening from time=6h to time=7h. What is the slope of this line?

6. Write an equation for this graph. Be sure to include the domain!!!