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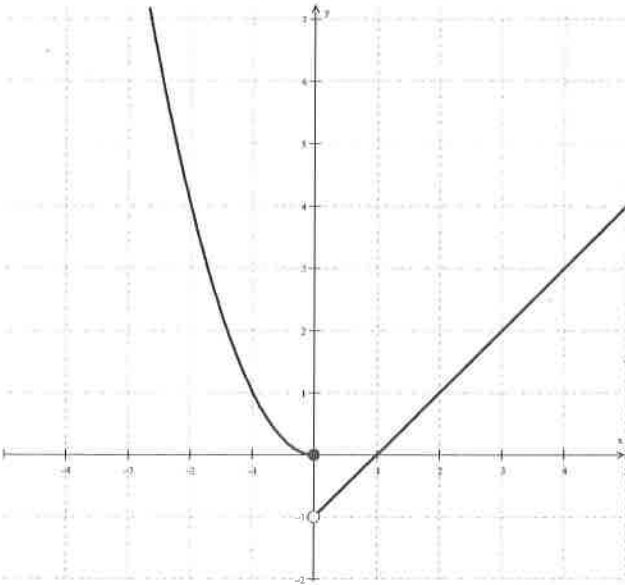
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Algebra II | Packer Collegiate Institute

Piecewise Functions

Piecewise functions are functions made up of different “pieces.” See, for example, the following graph:



Do you see the two different parts?

First part equation: _____

Second part equation: _____

What x -values does the first part cover?
(express in interval notation *and* in inequality form)

Interval: _____ Inequality: _____

What x -values does the second part cover?
(express in interval notation *and* in inequality form)

Interval: _____ Inequality: _____

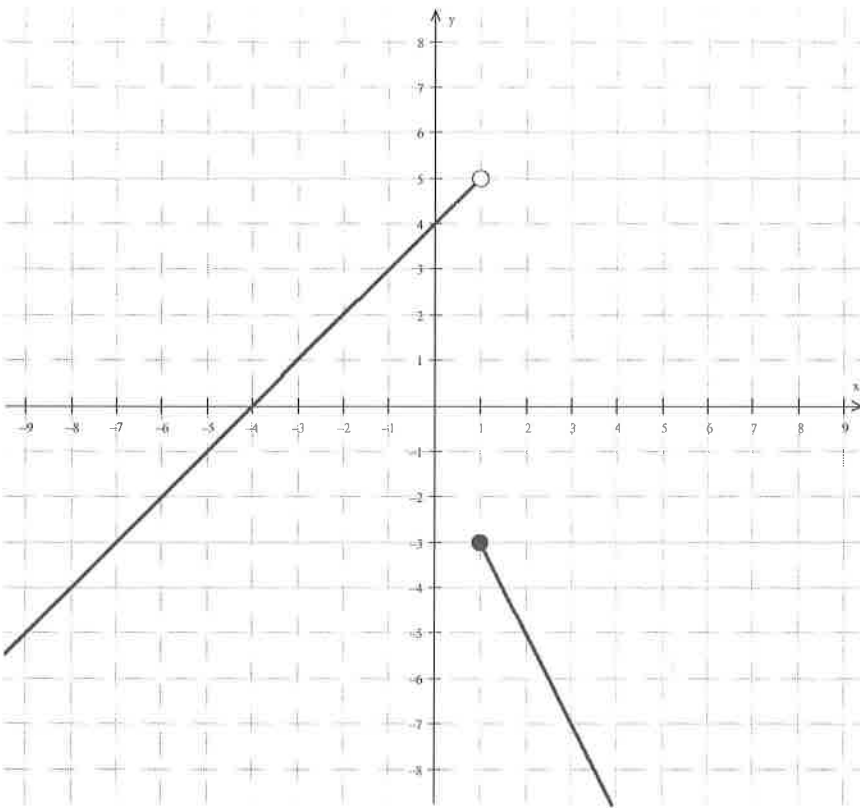
Now we have enough information to describe this piecewise function:

$$f(x) = \begin{cases} \text{_____} & \text{for } \text{_____} \\ \text{_____} & \text{for } \text{_____} \end{cases}$$

What this fancy equation tells us is that there are *two* parts to our function – and where these two parts are “valid.”

Evaluate, <u>using the graph</u> :	Evaluate, <u>using the equation</u> :
$f(-2) =$	$f(-2) =$
$f(-1) =$	$f(-1) =$
$f(0) =$	$f(0) =$
$f(1) =$	$f(1) =$
$f(2) =$	$f(2) =$

Now that we've talked about piecewise functions, try this on your own:



Write the *piecewise* function:

$$g(x) = \begin{cases} \underline{\hspace{2cm}} & \text{for } \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} & \text{for } \underline{\hspace{2cm}} \end{cases}$$

Evaluate the piecewise function at the following *x*-values:

$$g(-6) =$$

$$g(1) =$$

$$g(2) =$$

Let's do things a little differently now. I'm going to give you the piecewise function, and I want you to use it to evaluate it at some *x*-values, and then graph it.

$\text{Kai}(x) = \begin{cases} \frac{1}{3}x - 1 & \text{for } x \leq -3 \\ 2 & \text{for } -3 < x \leq 1 \\ x^2 & \text{for } x > 1 \end{cases}$	Kai(-6) =	Kai(-2.999) =
	Kai(-3) =	Kai(-3.001) =
	Kai(0) =	Kai(1.8) =
	Kai(1) =	Kai(10) =

How many pieces are there in this *piecewise function*? _____

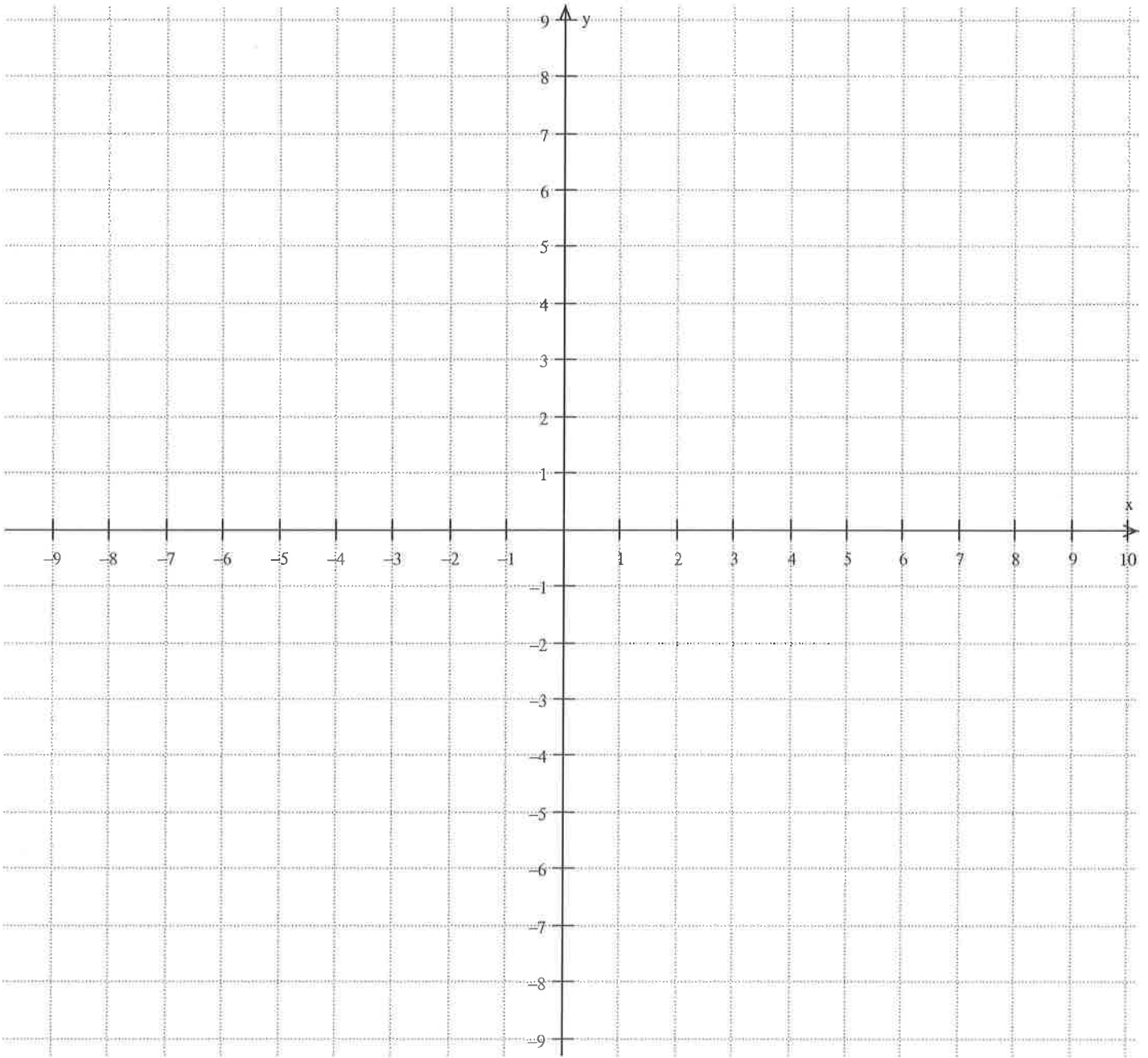
When you graph the piecewise function, what will the left-most piece look like?

When you graph the piecewise function, what will the middle piece look like?

When you graph the piecewise function, what will the right-most piece look like?

Now to graph!

$$\text{Kai}(x) = \begin{cases} \frac{1}{3}x - 1 & \text{for } x \leq -3 \\ 2 & \text{for } -3 < x \leq 1 \\ x^2 & \text{for } x > 1 \end{cases}$$



Problems!

1. Let $f(x) = \begin{cases} -8 & \text{for } x \leq 5 \\ 0 & \text{for } -5 < x < 5 \\ 5 & \text{for } x \geq 5 \end{cases}$ Evaluate $f(-6) =$
 $f(-5) =$
 $f(21) =$

2. Let $g(x) = \begin{cases} 5x - 9 & \text{for } x < 2 \\ 4 - x^2 & \text{for } x \geq 2 \end{cases}$ Evaluate $g(-6) =$
 $g(3) =$
 $g(2) =$

3-5: Write the piecewise function for the following graphs:

3. Graph	Equation of the pieces	Domain for the pieces	Piecewise Function

6. This is the mondo-mega problem. Graph the following piecewise function:

$$\text{Ian}(x) = \begin{cases} \sqrt[3]{x} & \text{for } x < -1 \\ |x| & \text{for } -1 \leq x < 2 \\ x^2 & \text{for } 2 \leq x < 3 \\ -5 & \text{for } x \geq 3 \end{cases}$$

