

Unit 1: Functions

Day 6: Graphing and Evaluating Piecewise Functions with Context Student Notes

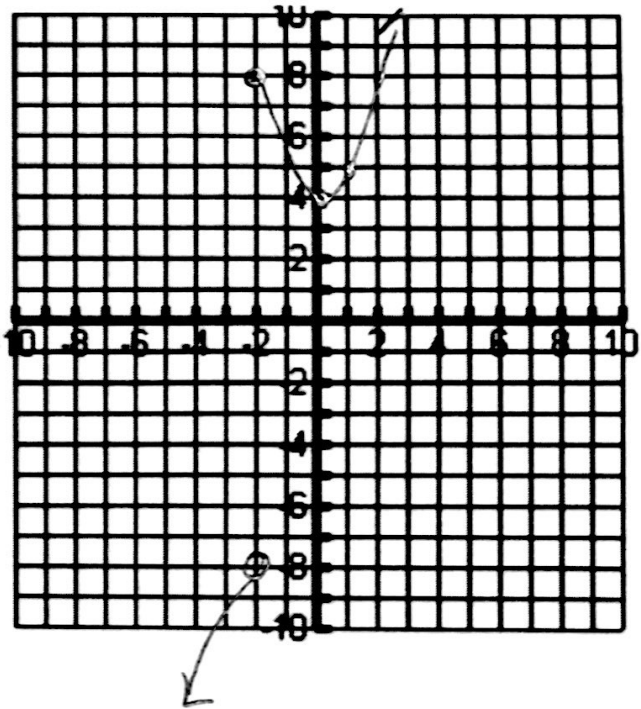
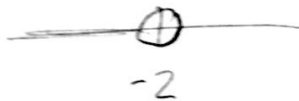
Example 1

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

$$f(x) = \begin{cases} -x^2 - 4, & x < -2 & (-2, -8) \\ x^2 + 4, & x \geq -2 & (-2, 8) \end{cases}$$

$$-(-2)^2 - 4 = -8$$

$$(-2)^2 + 4 = 8$$



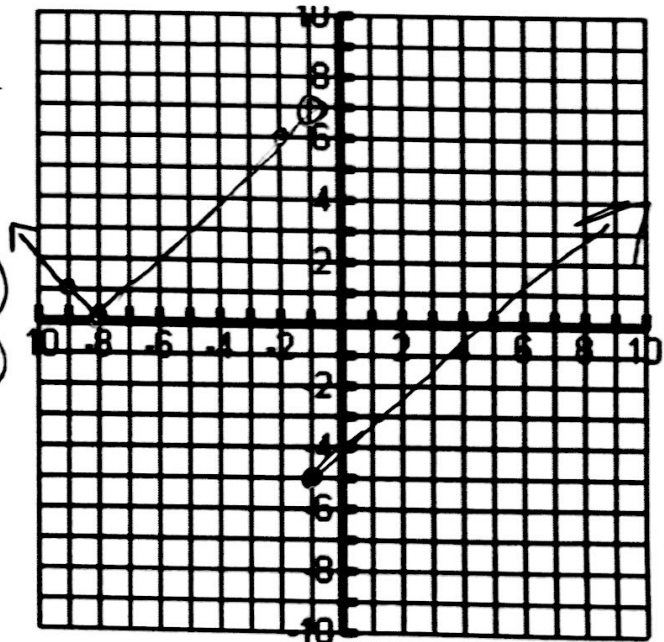
Example 2

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

$$f(x) = \begin{cases} x - 4, & x \geq -1 & (-1, -5) \\ |x + 8|, & x < -1 & (-1, 7) \end{cases}$$

$$-1 - 4 =$$

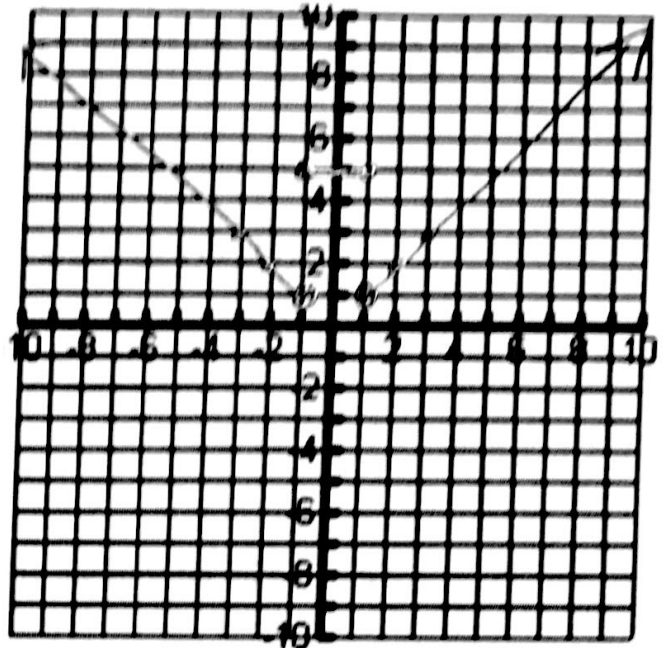
$$|-1 + 8| = 7$$



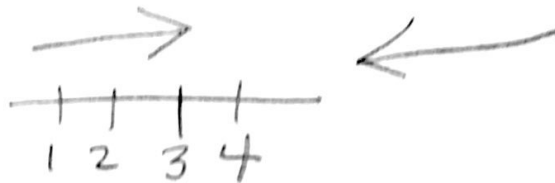
Example 3

Graph the following Piecewise Function. Make sure you restrict your domain for certain "pieces" of the function.

$$f(x) = \begin{cases} -x, & x < -1 & (-1, 1) \\ 5, & -1 \leq x \leq 1 & (-1, 5) \\ x, & x > 1 & (1, 5) \end{cases}$$



$$1 < 2$$



Evaluating Piecewise Functions

Given the following piecewise function, evaluate the following.

Hint: You can use your graph from the previous example if needed.

$$f(x) = \begin{cases} -x, & x < -1 \\ 5, & -1 \leq x \leq 1 \\ x, & x > 1 \end{cases}$$

$f(-9) =$ $-(-9) = 9$	$f(-1) =$ 5	$f(1) =$ 5
$f(-5) =$ $-(-5) = 5$	$f(0) =$ 5	$f(6) =$ 6

Student Try Example

Given the following piecewise function, evaluate the following.

Hint: You can use your graph from the previous example if needed.

$$f(x) = \begin{cases} |x-4|-7, & x \leq -1 \\ 2x-3, & -1 < x < 1 \\ -x^2-2, & x \geq 1 \end{cases}$$

$f(-3) = -3 - 4 - 7$ $ -7 - 7$ $7 - 7 = 0$	$f(-1) = -1 - 4 - 7$ $5 - 7 = -2$	$f(1) = -(1)^2 - 2$ $-1 - 2 = -3$
$f(-5) = -5 - 4 - 7$ $9 - 7 = 2$	$f(0) = 2(0) - 3$ $= -3$	$f(4) = -(4)^2 - 2 =$ $-16 - 2 = -18$

Piecewise Functions in Context

Postal charges for mailing packages depend on both weight and destination and this leads to an application of piecewise functions. For example, the rates for a certain destination are shown in the table below.

Weight in Pounds (x)	Postage Cost (y)
Under 1	\$0.80
1 or more, but under 2	\$1.00
2 or more, but under 4	\$1.25
4 or more	\$1.50

Create a piecewise function using the table above.

Graph the piecewise function on the following graph.

$$f(x) = \begin{cases} 0.8 & x < 1 & (1, 0.8) \\ 1 & 1 \leq x < 2 & (1, 1) (2, 1) \\ 1.25 & 2 \leq x < 4 & (2, 1.25) (4, 1.25) \\ 1.50 & x \geq 4 & (4, 1.5) \end{cases}$$

