

GUIDED NOTES: Piecewise Functions

Evaluating Piecewise Functions

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

$f(5) = -(5)^2 - 2 = -27$

$f(-4) = |-4-4| - 7 = 1$

EX1. $f(-3)$

$| -3 - 4 | - 7$
 $| -7 | - 7$
 $7 - 7$
 $= 0$

EX2. $f(0)$

$2(0) - 3$
 $0 - 3$
 $= -3$

EX3. $f(1)$

$-(1)^2 - 2$
 $-1 - 2$
 $= -3$

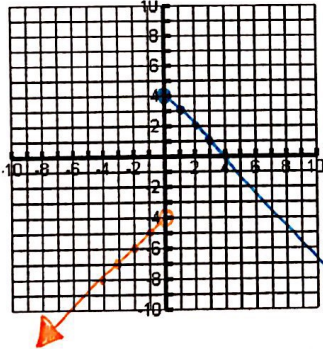
EX4. $f(5) + 6f(-4)$

$-27 + 6(1)$
 $= -21$

Graphing Piecewise Functions

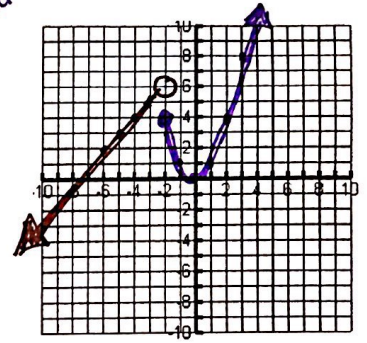
EX5. $f(x) = \begin{cases} x-4, & x < 0 \\ -x+4, & x \geq 0 \end{cases}$

open dot
 closed dot
 "included"



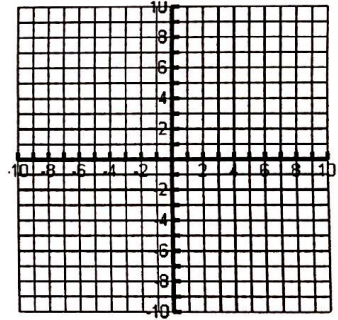
EX6.

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



EX7.

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

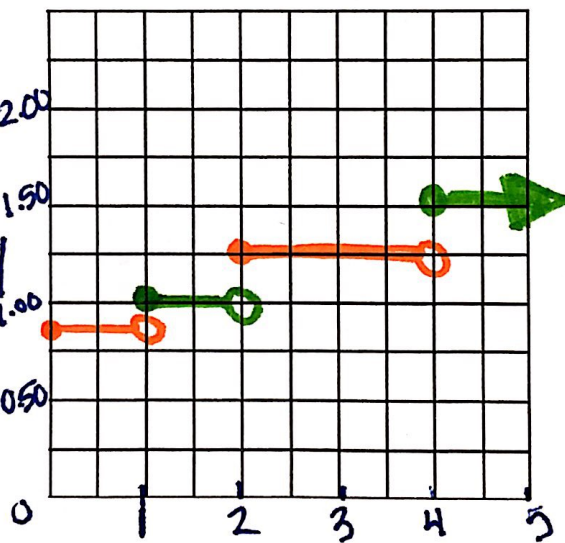


Piecewise Functions in Context

EX9. 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.

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

$$f(x) = \begin{cases} 0.80 & 0 \leq x < 1 \\ 1.00 & 1 \leq x < 2 \\ 1.25 & 2 \leq x < 4 \\ 1.50 & x \geq 4 \end{cases}$$



*Flat rate
= Flat line