Sec 2.2.3
Piece-wise Functions

a function defined by more than one equation over a specified domain

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-Example-
"usage" rates....if you use less than a certain amount you're charged at one rate, more than a certain amount, charged a different rate

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purchasing...if purchasing a small number of something charged one price but if purchasing a larger number charged a different price...

Given: $f(x) = \begin{cases} 3x+5, & \text{if } x<0 \\ 4x+7, & \text{if } x \geq 0 \end{cases}$

Determine $f(-2)$

use $3x+5$ $x<0$

$= 3(-2)+5$

$= -1$

$f(0)$ x

$4(0)+7$

$= 7$

$f(3)$ $x \geq 0$ use $4x+7$

$4(3)+7$

$= 19$

Given: $f(x) = \begin{cases} \frac{x^2-16}{x-4}, & \text{if } x \neq 4 \\ 8, & \text{if } x = 4 \end{cases}$

Determine $f(0)$

$x \neq 4$

$\frac{0^2-16}{0-4} = 4$

$f(4)$ ← $x = 4$

$f(4) = 8$

Determine

$$g(x)=\begin{cases}3, & x\le -1\\ 2x-3, & -1<x\le 3\\ \dfrac{4}{x}, & x>3\end{cases}$$

g(-5) $= 3$

g(-1) $= 3$

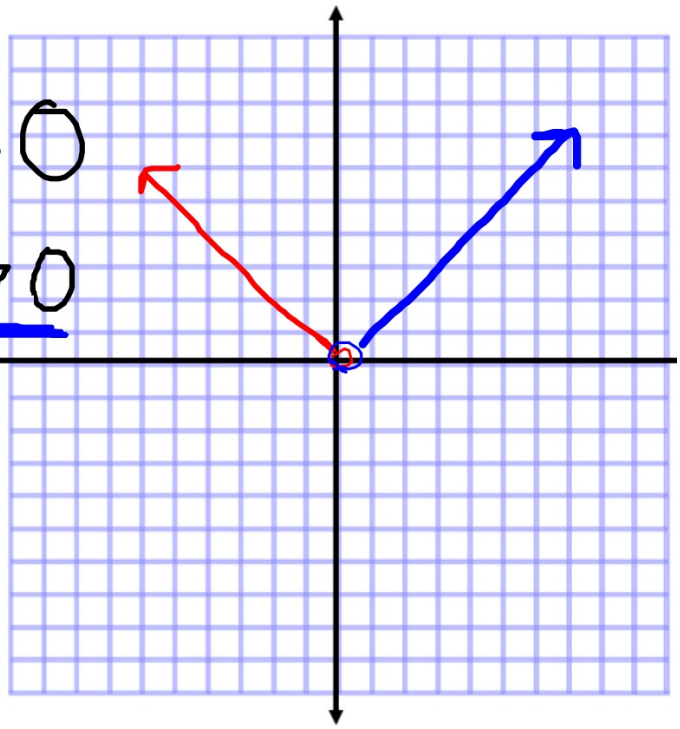
g(0) $= 2(0)-3=-3$

g(3) $= 2(3)-3=3$

g(5) $= \dfrac{4}{5}$

Graph –

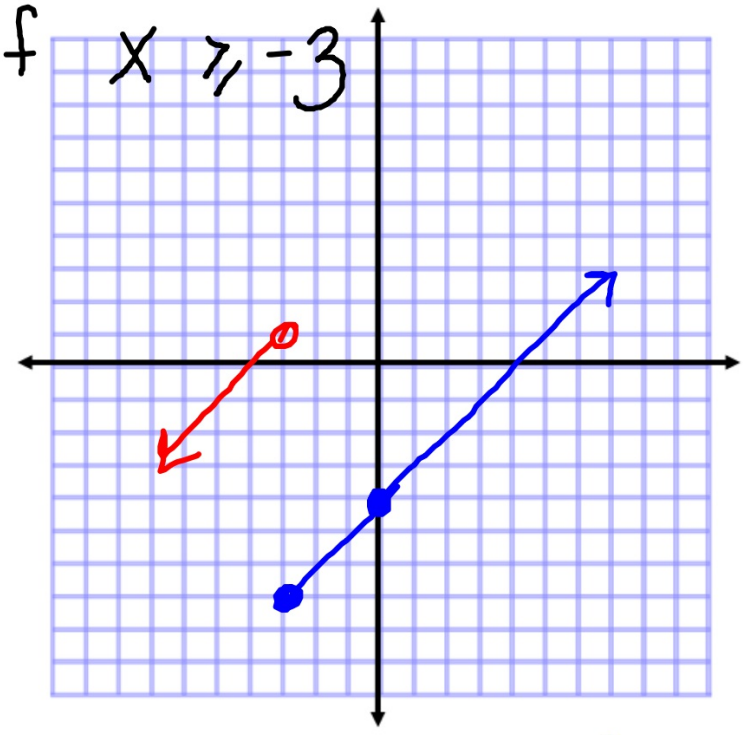
$$f(x) = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$$



$y = -x$ $\quad$ $y = x$

$x < 0$ $\quad$ $x \geq 0$

$$f(x) = \begin{cases} x+4, & \text{if } x < -3 \\ x-4, & \text{if } x \geq -3 \end{cases}$$



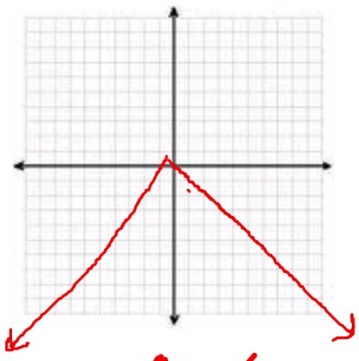
BTW $f(-3) = 7$

Suggested Practice
Sec 2.2
pages 240-241
39,41,42
44,45,47,49,51,53,54

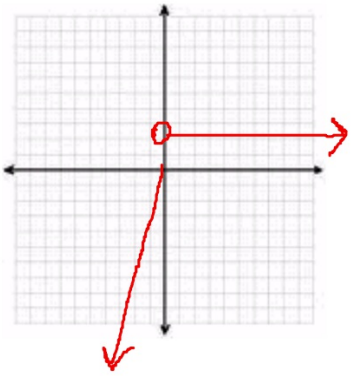
39. a. 3
b. 3
c. 0

41. a. 8 c. 6
b. 3

42. a. 12
b. 5
c. 10

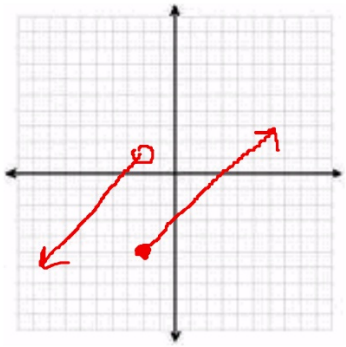
44. 

$(-\infty, 0]$

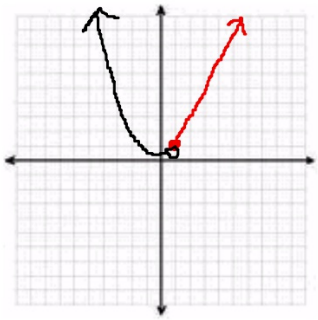
45. 

$(-\infty, 0] \cup [2]$

47.

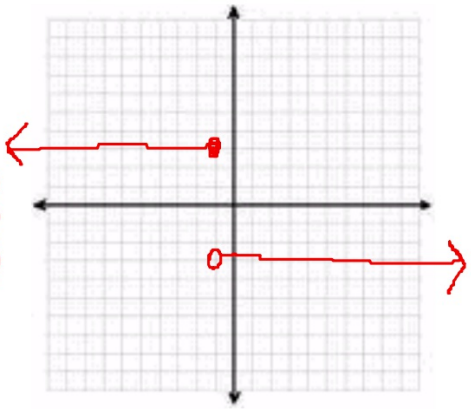


51.

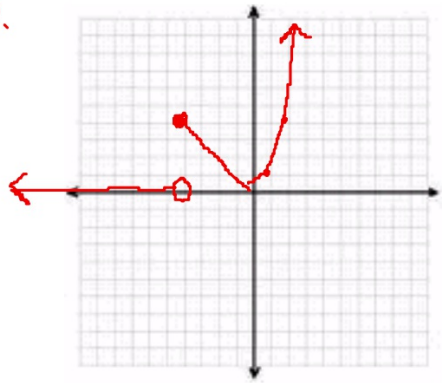


49.

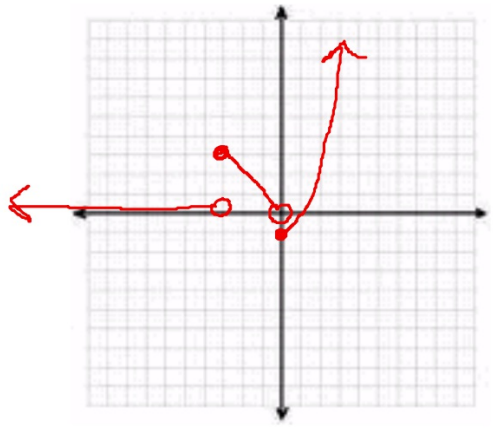
r: {±3}



53.



54.



$r: [-1, \infty)$

$f(-3) = 3$

$f(0) = -1$