

Section ~~3.5~~ 3.5

1-6: Find the indicated value for each function.

$$1) f(x) = \begin{cases} 3x, & \text{if } x < 0 \\ 2x + 1, & \text{if } x \geq 0 \end{cases}$$

~~plug in~~

a) $f(-5)$

plug in (-5) into the top equation since it is for values of $x < 0$

$$f(-5) = 3(-5)$$

$$f(-5) = -15$$

b) $f(0)$

plug (0) into the bottom equation since it is for values

$$x \geq 0$$

$$f(0) = 2(0) + 1 \\ = 0 + 1$$

$$f(0) = 1$$

c) $f(2)$

plug (2) into the bottom equation since $2 \geq 0$

$$f(2) = 2(2) + 1 \\ = 4 + 1$$

$$f(2) = 5$$

$$3) g(x) = \begin{cases} x - 5, & \text{if } x < -1 \\ x, & \text{if } -1 \leq x \leq 2 \\ x + 2, & \text{if } x > 2 \end{cases}$$

a) $g(-1)$

plug (-1) in the middle equation since $-1 \leq -1 \leq 2$

$$g(-1) = -1$$

b) $g(2)$

plug (2) into the middle equation since $-1 \leq \underline{2} \leq 2$ is a true statement

$$g(2) = 2$$

c) $g(0)$

also plug (0) into the middle equation since $-1 \leq \underline{0} \leq 2$ is a true statement

$$g(0) = 0$$

$$5) \quad K(x) = \begin{cases} x^2 - 10, & \text{if } x < -10 \\ x^2, & \text{if } -10 \leq x \leq 10 \\ x^2 + 10, & \text{if } x > 10 \end{cases}$$

a) $K(-10)$

plug (-10) into the middle equation since $-10 \leq \underline{-10} \leq 10$ is a true statement

$$K(-10) = (-10)^2$$

$$\boxed{K(-10) = 100}$$

b) $K(11)$

plug (11) into the bottom equation since $\underline{11} > 10$ is a true statement

$$K(11) = (11)^2 + 10$$

$$= 121 + 10$$

$$\boxed{K(11) = 131}$$

c) $K(0)$

plug (0) into the middle equation since $-10 \leq 0 \leq 10$ is a true statement

$$K(0) = (0)^2$$

$$\boxed{K(0) = 0}$$

7) sketch a graph of each function

$$f(x) = \begin{cases} 3x, & \text{if } x < 0 \\ 2x+1, & \text{if } x \geq 0 \end{cases}$$

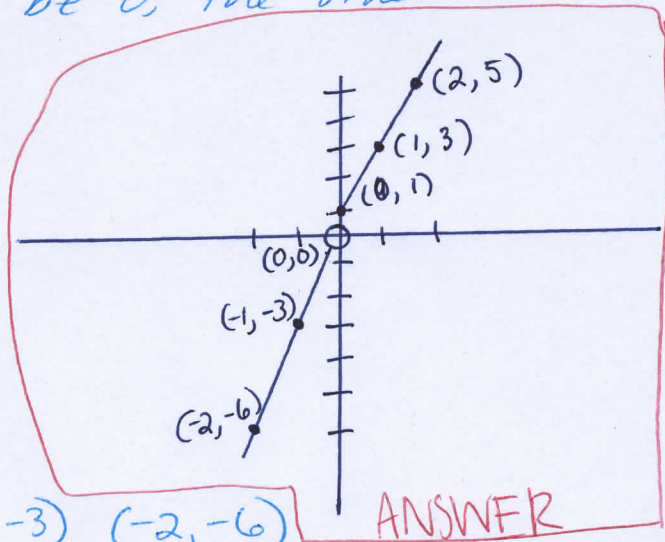
first, graph $f(x) = 3x$ ($x < 0$)

I will create a table that has 3 values in the x-column, one of the numbers must be 0, the other two must be less than 0

$3x$

0	$f(0) = 3(0) = 0$
-1	$f(-1) = 3(-1) = -3$
-2	$f(-2) = 3(-2) = -6$

plot the points $(0,0)$ $(-1,-3)$ $(-2,-6)$
open circle



second, graph $f(x) = 2x + 1$

create table with 3 values in x-column, one must be 0, the others must be ≥ 0

$2x + 1$

0	$f(0) = 2(0) + 1 = 1$
1	$f(1) = 2(1) + 1 = 3$
2	$f(2) = 2(2) + 1 = 5$

plot points

$(0,1)$ $(1,3)$ $(2,5)$
solid circle

on the same graph

9) Sketch a graph of each equation

$$g(x) = \begin{cases} x-5, & \text{if } x < -1 \\ x, & \text{if } -1 \leq x \leq 2 \\ x+2, & \text{if } x > 2 \end{cases}$$

first, graph $g(x) = x-5$ ($x < -1$)

$$g(x) = x-5$$

-1	$g(-1) = (-1) - 5 = -6$	$(-1, -6)$ open circle
-2	$g(-2) = (-2) - 5 = -7$	$(-2, -7)$
-3	$g(-3) = (-3) - 5 = -8$	$(-3, -8)$

second, graph $g(x) = x$ ($-1 \leq x \leq 2$)

$$g(x) = x$$

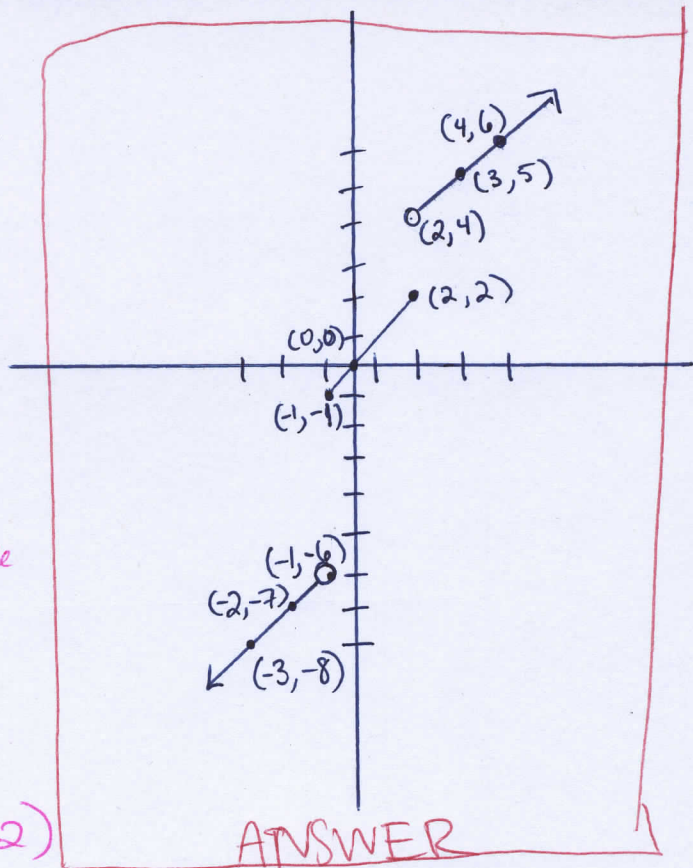
-1	$g(-1) = -1$	$(-1, -1)$
0	$g(0) = 0$	$(0, 0)$
2	$g(2) = 2$	$(2, 2)$

all closed circles

third, graph $g(x) = x+2$ ($x > 2$)

$$g(x) = x+2$$

2	$g(2) = (2) + 2 = 4$	$(2, 4)$ open circle
3	$g(3) = (3) + 2 = 5$	$(3, 5)$
4	$g(4) = (4) + 2 = 6$	$(4, 6)$



11) sketch a graph of each function

$$k(x) = \begin{cases} x^2 - 2, & \text{if } x < -1 \\ x^2, & \text{if } -1 \leq x \leq 1 \\ x^2 + 2, & \text{if } x > 1 \end{cases}$$

first, graph $k(x) = x^2 - 2$ ($x < -1$)

-1 | $k(-1) = (-1)^2 - 2 = -1$ $(-1, -1)$ open circle
 -2 | $k(-2) = (-2)^2 - 2 = 2$ $(-2, 2)$
 -3 | $k(-3) = (-3)^2 - 2 = 7$ $(-3, 7)$
 graph should have a slight curve +
 not be a line because of the x^2
 you may want to use your calculator

second, graph $k(x) = x^2$ ($-1 \leq x \leq 1$)

-1 | $k(-1) = (-1)^2 = 1$ $(-1, 1)$ closed circle
 0 | $k(0) = (0)^2 = 0$ $(0, 0)$
 1 | $k(1) = (1)^2 = 1$ $(1, 1)$ closed circle
 graph also should have slight curve

third, graph $k(x) = x^2 + 2$ ($x > 1$)

1 | $k(1) = (1)^2 + 2 = 3$ $(1, 3)$ open circle
 2 | $k(2) = (2)^2 + 2 = 6$ $(2, 6)$
 3 | $k(3) = (3)^2 + 2 = 11$ $(3, 11)$
 again, graph should have a slight curve

