

8.3: Piecewise Functions

**Evaluate the function.**

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

a)  $f(-3)$

b)  $f(7)$

c)  $f(2)$

2)  $f(x) = \begin{cases} -x^2 + 1, & x < -4 \\ 2|x| - 4, & -4 \leq x < 5 \\ x - 7, & x \geq 5 \end{cases}$

a)  $f(3)$

b)  $f(-12)$

c)  $f(5)$

3) Given  $f(x) = \begin{cases} 3x + 2, & x \leq -1 \\ x - 2, & -1 < x \leq 4 \\ 2x - 5, & x > 4 \end{cases}$

Find:

a)  $f(-4)$

b)  $f(-1)$

c)  $f(4)$

d)  $f(18)$

4) Given  $f(x) = \begin{cases} 3x^2 + 2, & -9 \leq x < -1 \\ x - 5, & -1 < x \leq 4 \\ |x|, & x > 4 \end{cases}$

Find:

a)  $f(-4)$

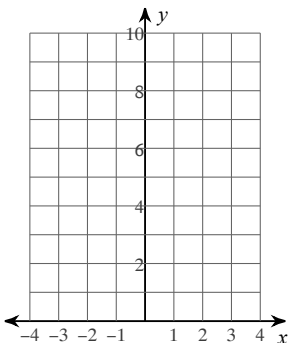
b)  $f(0)$

c)  $f(4)$

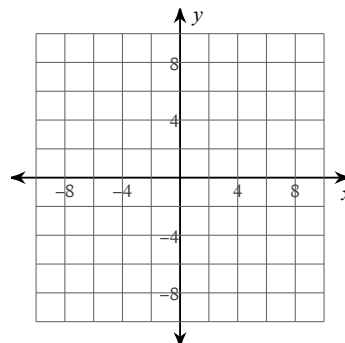
d)  $f(18)$

**Graph the function on the given interval**

5)  $y = x^2$  for  $-1 \leq x < 3$

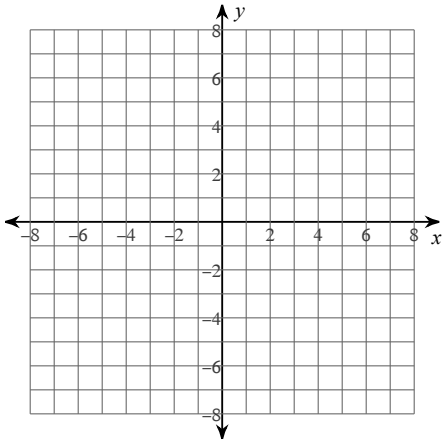


6)  $y = x + 4$  for  $x \leq 4$

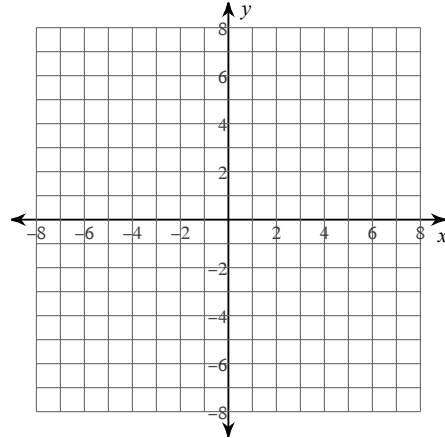


Graph each function.

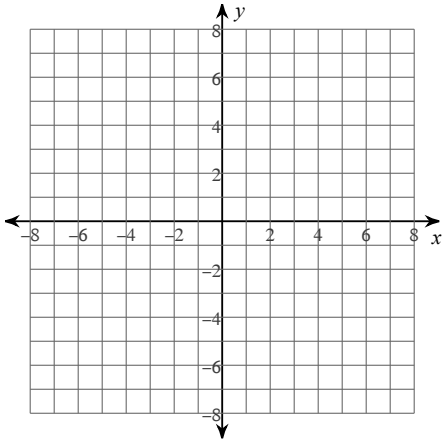
$$7) \begin{cases} |x+2| + 1, & -5 \leq x < 2 \\ -|x-3| + 4, & 2 \leq x < 7 \end{cases}$$



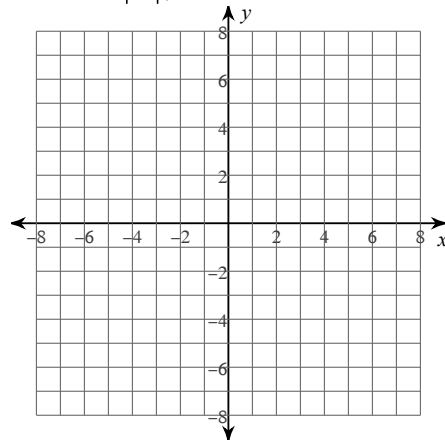
$$8) \begin{cases} x^2, & x < 1 \\ -2, & 1 \leq x < 4 \\ x-4, & x \geq 4 \end{cases}$$



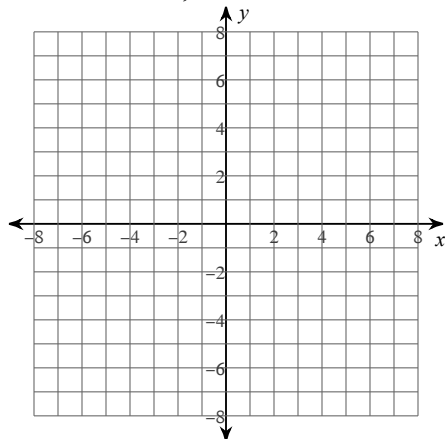
$$9) f(x) = \begin{cases} 4x, & x < 2 \\ x^2 - 8, & 2 \leq x < 3 \end{cases}$$



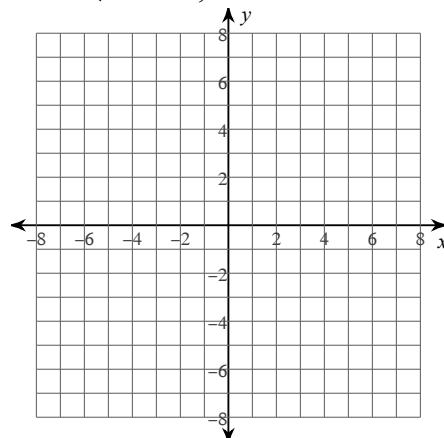
$$10) f(x) = \begin{cases} -x^2 - 1, & x \leq -2 \\ 2|x|, & x > -2 \end{cases}$$



$$11) f(x) = \begin{cases} -\frac{1}{2}x + 4, & x < 0 \\ x^2 + 1, & x \geq 0 \end{cases}$$

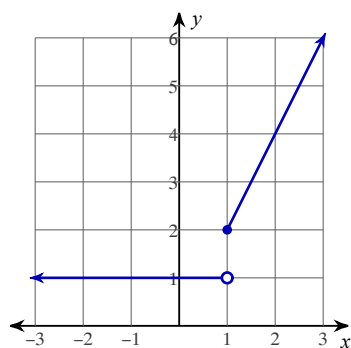


$$12) f(x) = \begin{cases} -|x| + 2, & x < 0 \\ 2x^2 + 2, & x \geq 0 \end{cases}$$

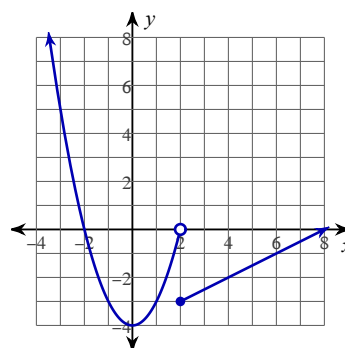


Write the equation and domain of the piecewise function below:

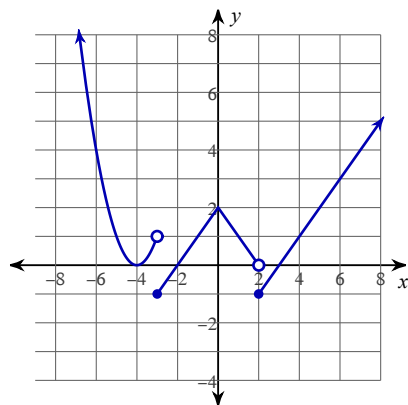
13)



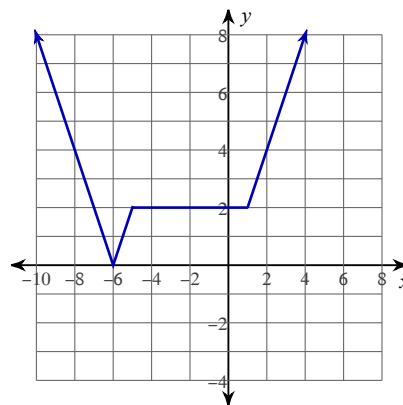
14)



15)

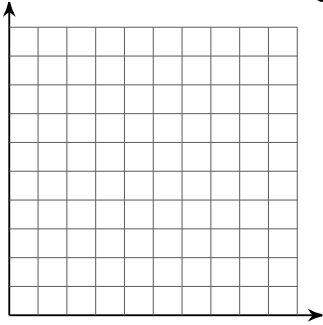


16)

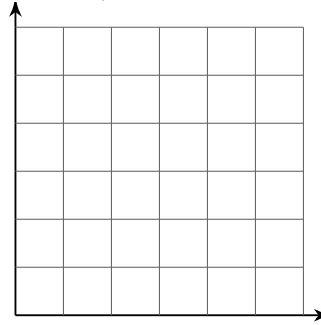


**Sketch a graph that would model the scenario below:**

- 17) Steven is driving to the store. He stops at a light half way there. He arrives and finds the store is closed so he goes home.

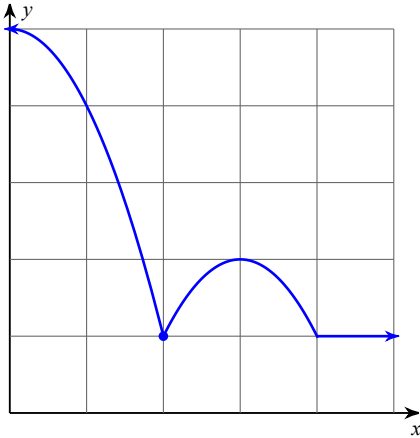


- 18) Every time Samantha trains for a 5k race she starts with a 5 min sprint, then jogs for 20 min, and then walks for 5 min.



**Write a situation that could be modeled by the following graph.**

- 19)



- 20)

