

7.2: Piecewise and Step Functions

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

Find:

a) $f(-4)$

b) $f(0)$

c) $f(4)$

d) $f(18)$

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

a) $f(-3)$

b) $f(7)$

c) $f(2)$

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

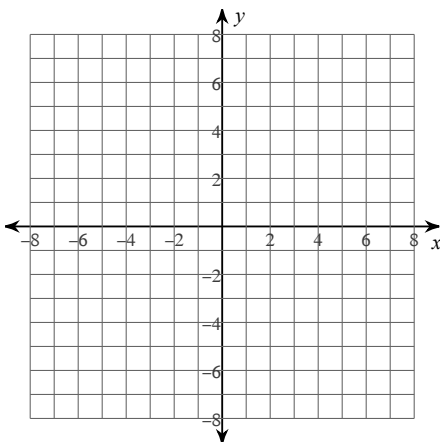
a) $f(3)$

b) $f(-12)$

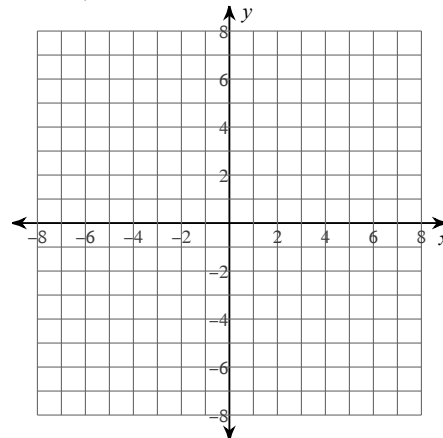
c) $f(5)$

Graph each function.

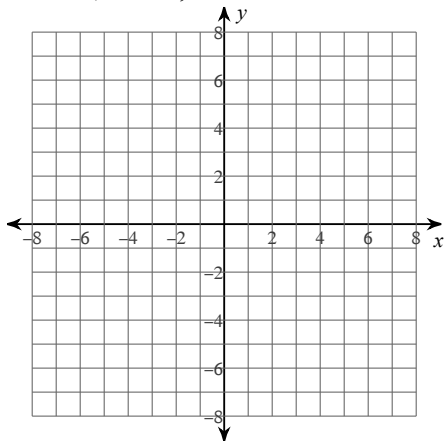
4) $\begin{cases} |x+2| + 1, & -5 \leq x < 2 \\ -|x-3| + 4, & 2 \leq x < 7 \end{cases}$



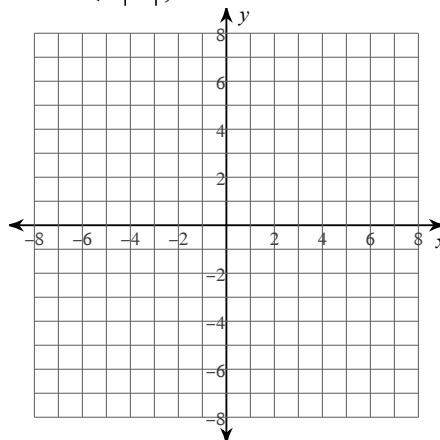
5) $\begin{cases} x^2, & x < 1 \\ -2, & 1 \leq x < 4 \\ \sqrt{x}, & x > 4 \end{cases}$



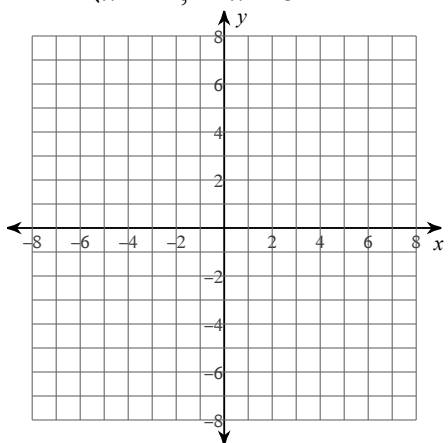
$$6) f(x) = \begin{cases} 4x, & x < 2 \\ x^2 - 8, & 2 \leq x < 3 \end{cases}$$



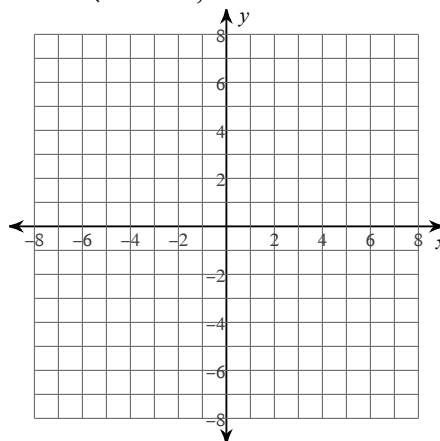
$$7) f(x) = \begin{cases} 0.5(x + 4)^3, & x \leq -2 \\ 2|x|, & x > -2 \end{cases}$$



$$8) f(x) = \begin{cases} -\frac{1}{2}x + 4, & x < 0 \\ x^2 + 1, & x \geq 0 \end{cases}$$



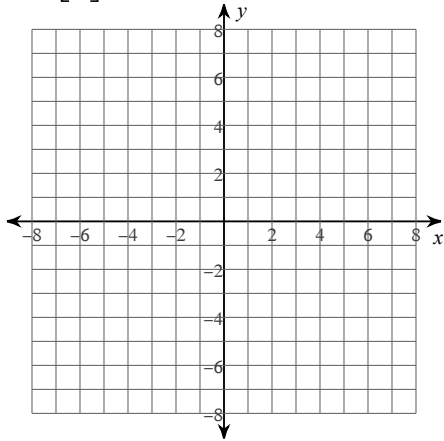
$$9) f(x) = \begin{cases} -|x| + 2, & x < 0 \\ 2x^2 + 2, & x \geq 0 \end{cases}$$



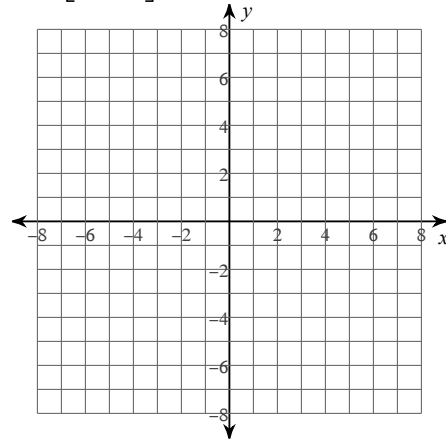
- 10) Describe the similarities and differences between the floor function and the ceiling function. Give an example of when these concepts are used in "real life".

Graph each step function.

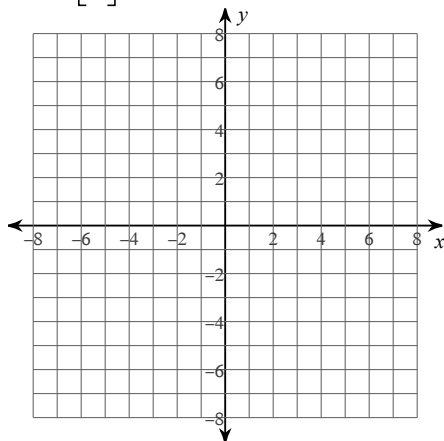
11) $y = \lfloor x \rfloor + 2$



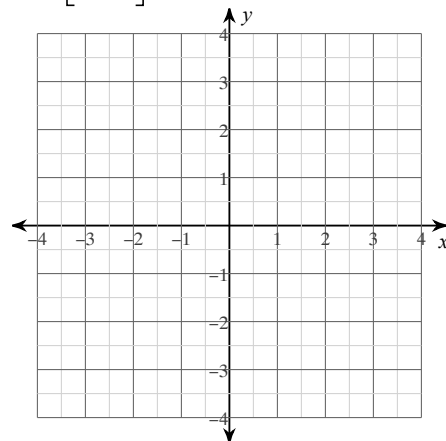
12) $y = \lfloor x - 1 \rfloor$



13) $y = 2\lfloor x \rfloor + 1$



14) $y = \lfloor 0.5x \rfloor + 1$



15) Write a step function that is equivalent to the function: $y = \lfloor x + 2 \rfloor$.