

3.3 Practice – Piecewise Functions

Name: Solutions

Pre-Calculus

Find the value of the given function at the indicated domain value.

$$g(x) = \begin{cases} -x^2 - 5x + 2, & x < 1 \\ x^3 - 5x, & 1 \leq x < 11 \\ -\sqrt{3x-16}, & x > 11 \end{cases}$$

$$h(x) = \begin{cases} 2x^2 - 2x + 1, & x \leq -6 \\ 3x - x^3, & -3 < x \leq 1 \\ 2x - |x - 10|, & x > 1 \end{cases}$$

1. $g(1) = (1)^3 - 5(1)$
 $\boxed{-4}$

2. $g(11) =$ DNE

3. $h(5) = 2(5)^2 - 15 - 10$
 $10 - 5$
 $\boxed{5}$

4. $h(-10) = 2(-10)^2 - 2(-10) + 1$
 $200 + 20 + 1 = \boxed{221}$

5. $g(-1) = -(-1)^2 - 5(-1) + 2$
 $\boxed{6}$

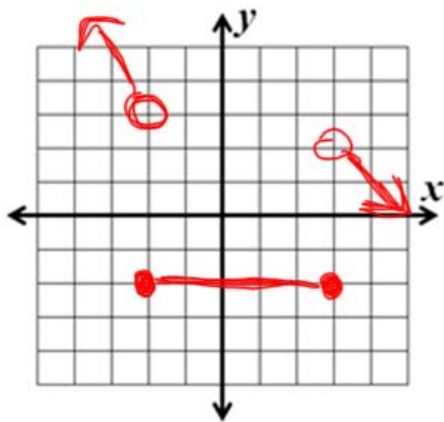
6. $h(0) = 3(0) - (0)^3$
 $\boxed{0}$

7. $g(20) = -\sqrt{3(20)-16}$
 $\boxed{-2\sqrt{11}}$

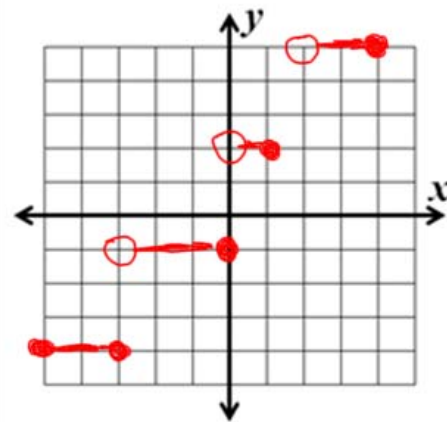
8. $h(-4) =$ Undefined

Graph the following piecewise functions.

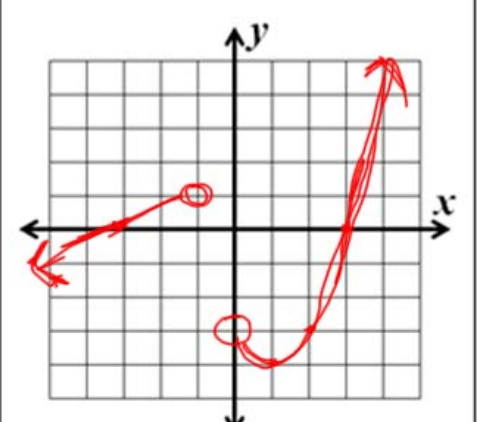
9. $f(x) = \begin{cases} -2x - 1, & x < -2 \\ -2, & -2 \leq x \leq 3 \\ -x + 5, & x > 3 \end{cases}$



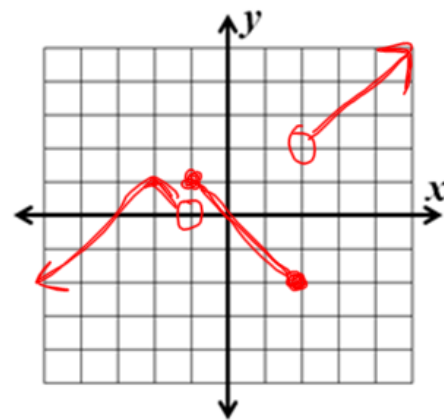
10. $f(x) = \begin{cases} -4, & -5 \leq x \leq -3 \\ -1, & -3 < x \leq 0 \\ 2, & 0 < x \leq 1 \\ 5, & 2 < x \leq 4 \end{cases}$



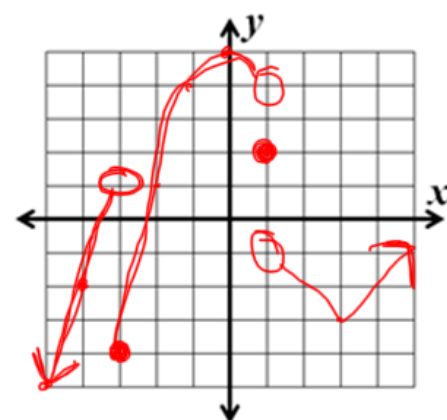
11. $h(x) = \begin{cases} \frac{2}{3}x + 2, & x < -1 \\ (x-1)^2 - 4, & x > 0 \end{cases}$



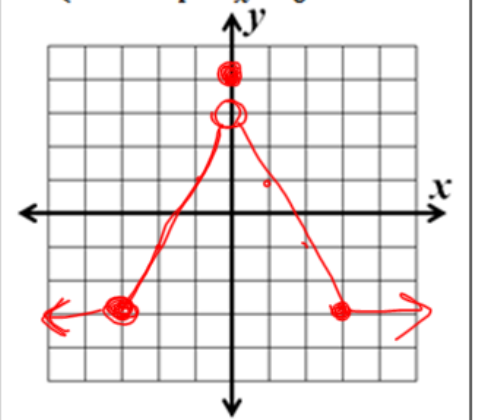
12. $f(x) = \begin{cases} -|x+2| + 1, & x < -1 \\ -x, & -1 \leq x \leq 2 \\ x, & x > 2 \end{cases}$



13. $h(x) = \begin{cases} 3x + 10, & x < -3 \\ -x^2 + 5, & -3 \leq x < 1 \\ 2, & x = 1 \\ |x-3| - 3, & x > 1 \end{cases}$



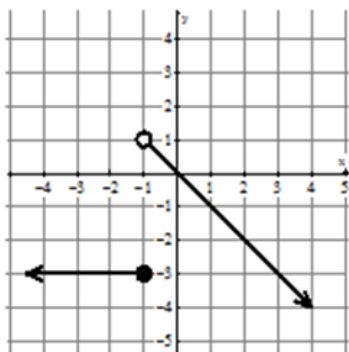
14. $g(x) = \begin{cases} -3, & x < -3 \\ 2x + 3, & -3 \leq x < 0 \\ -2x + 3, & 0 < x \leq 3 \\ -3, & x > 3 \\ 4, & x = 0 \end{cases}$



Given the graph of f , write out the function's equation.

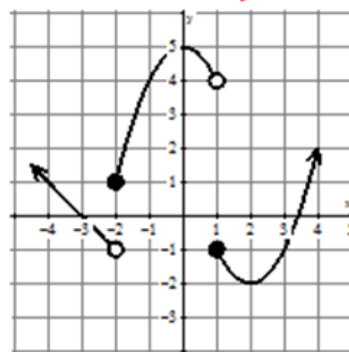
15.

$$f(x) = \begin{cases} -3, & x \leq -1 \\ -x, & x > -1 \end{cases}$$



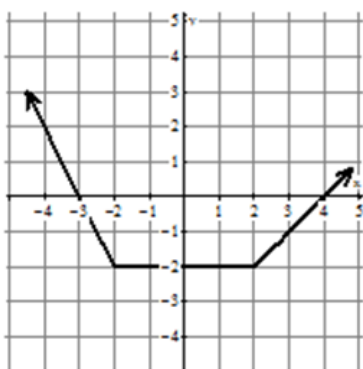
16.

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



17.

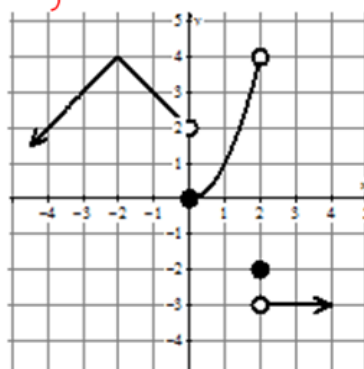
$$f(x) = \begin{cases} -2x-6, & x \leq -2 \\ -2, & -2 < x < 2 \\ x-4, & x \geq 2 \end{cases}$$



It does not matter which one has the "or equal to" part, but one of them needs it.

18.

$$f(x) = \begin{cases} -|x+2|+4, & x < 0 \\ x^2, & 0 \leq x < 2 \\ -2, & x = 2 \\ -3, & x > 2 \end{cases}$$



Tell if the function is continuous. Show any work that leads to your conclusion.

19. $h(x) = \begin{cases} x+1, & x < 2 \\ 2x-1, & x \geq 2 \end{cases}$

$$(2)+1 = 2(2)-1 \\ 3 = 3 \quad \checkmark$$

Yes

20. $g(x) = \begin{cases} x+3, & x < -1 \\ x^2-x, & x > -1 \\ 3, & x = -1 \end{cases}$

$$(-1)+3 = (-1)^2 - (-1) = 3 \\ 2 = 2 = 3 \quad \times$$

No

21. $f(x) = \begin{cases} 4x^2-2x, & x < 3 \\ 10x, & x = 3 \\ 30, & x > 3 \end{cases}$

$$4(3)^2 - 2(3) = 10(3) = 30 \\ 30 = 30 = 30 \quad \checkmark$$

Yes

22. $f(x) = \begin{cases} 21-3x, & x < 5 \\ 2x-4, & x > 5 \end{cases}$

No. The domain skips $x = 5$, so it can't be continuous.