3.3 Practice – Piecewise Functions

Name: _____

Pre-Calculus

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

$$g(x)=\begin{cases}-x^2-5x+2, & x<1\\ x^3-5x, & 1\le x<11\\ -\sqrt{3x-16}, & x>11\end{cases} \qquad h(x)=\begin{cases}2x^2-2x+1, & x\le -6\\ 3x-x^3, & -3<x\le 1\\ 2x-|x-10|, & x>1\end{cases}$$

1. $g(1)=$ $(1)^3-5(1)$ $=1-5$ $g(1)=-4$

2. $g(11)=$ D.N.E.

3. $h(5)=$ $2(5)-|(5)-10|$ $=10-|-5|$ $=10-5$ $h(5)=5$

4. $h(-10)=$ $2(-10)^2-2(-10)+1$ $=2(100)+20+1$ $=200+21$ $h(-10)=221$

5. $g(-1)=$ $-(-1)^2-5(-1)+2$ $=-(1)+5+2$ $=-1+7$ $g(-1)=6$

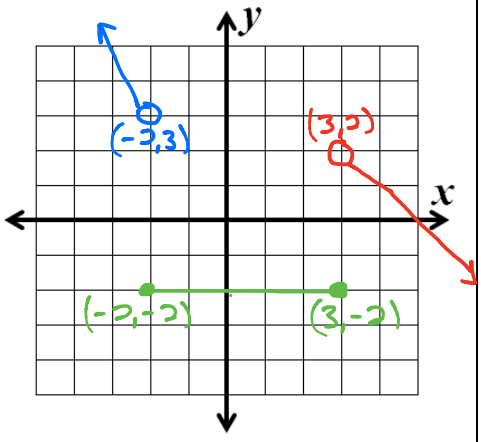
6. $h(0)=$ $3(0)-(0)^2$ $=0-0$ $h(0)=0$

7. $g(20)=$ $-\sqrt{3(20)-16}$ $=-\sqrt{60-16}$ $=-\sqrt{44}$ $g(20)=-2\sqrt{11}$

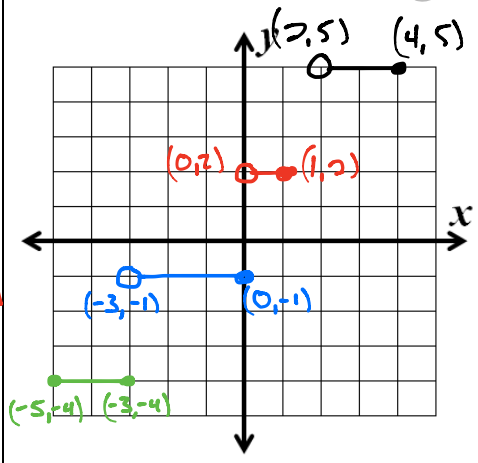
8. $h(-4)=$ D.N.E.

Graph the following piecewise functions.

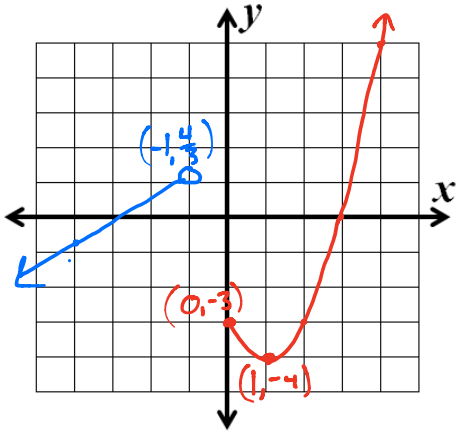
9. $$f(x)=\begin{cases}-2x-1, & x<-2\\ -2, & -2\le x\le 3\\ -x+5, & x>3\end{cases}$$



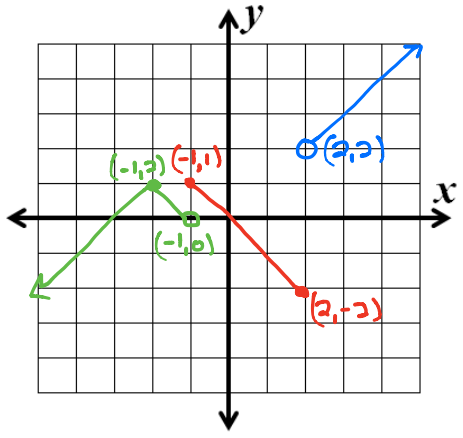
10. $$f(x)=\begin{cases}-4, & -5\le x\le -3\\ -1, & -3<x\le 0\\ 2, & 0<x\le 1\\ 5, & 2<x\le 4\end{cases}$$



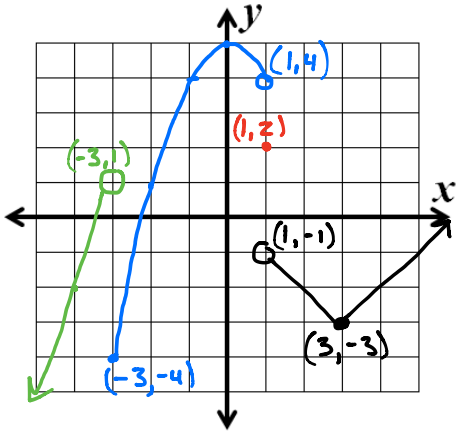
11. $$h(x)=\begin{cases}\frac{2}{3}x+2, & x<-1\\ (x-1)^2-4, & x>0\end{cases}$$



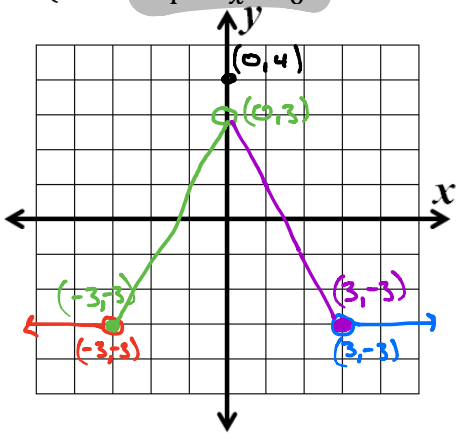
12. $$f(x)=\begin{cases}-|x+2|+1, & x<-1\\ -x, & -1\le x\le 2\\ x, & x>2\end{cases}$$



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



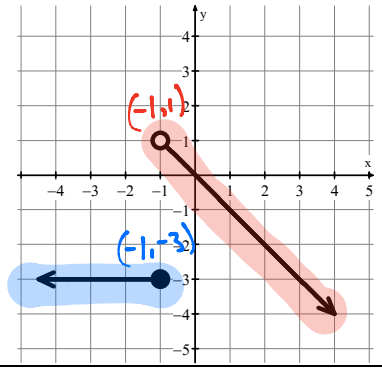
14. $$g(x)=\begin{cases}-3, & x<-3\\ 2x+3, & -3\le x<0\\ -2x+3, & 0<x\le 3\\ -3 & x>3\\ 4 & x=0\end{cases}$$



Given the graph of f, write out the function's equation. Use a linear expression ($mx + b$) for straight lines, absolute values if there is a "V" graph.

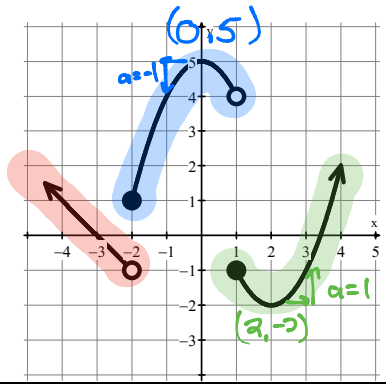
15.

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



16.

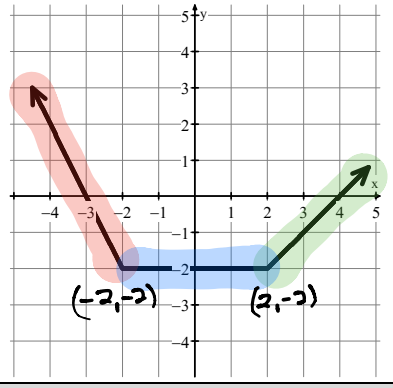
$$f(x) = \begin{cases} -x - 3, & x < -2 \\ -x^2 + 5, & -2 \le x < 1 \\ (x-2)^2 - 2, & x \ge 1 \end{cases}$$



17.

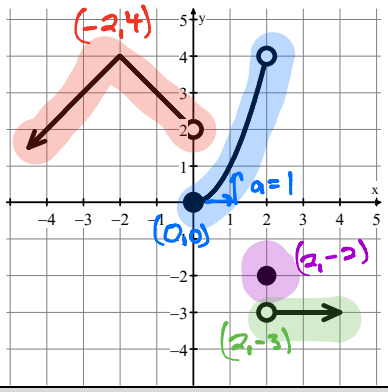
$$f(x) = \begin{cases} -2x - 6, & x < -2 \\ -2, & -2 \le x \le 2 \\ x - 4, & x > 2 \end{cases}$$

The "or equal to" can be in a different location.



18.

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



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

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

@ $x = 2$: $x+1 = 2x-1$

$(2)+1 = 2(2)-1$

$3 = 4-1$

$3 = 3$

∴ CONTINUOUS

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

@ $x = 1$: $x+3 = x^2 - x = 3$

$(-1)+3 = (-1)^2 - (-1) = 3$

$2 = 1+1 = 3$

$2 = 2 = 3$

∴ DISCONTINUOUS

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

@ $x = 3$: $4x^2 - 2x = 10x = 30$

$4(3)^2 - 2(3) = 10(3) = 30$

$4(9) - 6 = 30 = 30$

$36 - 6 = 30 = 30$

$30 = 30 = 30$

∴ CONTINUOUS

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

5 ∉ Domain

∴ DISCONTINUOUS