Math 1314 Review 2(answers)

Find the slope of the line passing through the given pair of points.(1-3)

1. $(3,2),(5,1)$

$m=\dfrac{1-2}{5-3}=\boxed{-\dfrac{1}{2}}$

2. $(-2,2),(-2,1)$

$m=\dfrac{1-2}{-2-(-2)}=\boxed{undefined}$

3. $(3,\frac{1}{4}),(5,\frac{1}{4})$

$m=\dfrac{\frac{1}{4}-\frac{1}{4}}{5-3}=\dfrac{0}{2}=\boxed{0}$

Write an equation for the line that satisfies the given conditions.(4-7)

4. Passes through $(-3,2)$ with slope -6.

$y-2=-6[x-(-3)]$

$\boxed{y-2=-6(x+3)}$

5. Passes through $(1,6),(-1,2)$.

$m=\dfrac{2-6}{-1-1}=\dfrac{-4}{-2}=2$

$\boxed{y-6=2(x-1)}$

or

$y-2=2[x-(-1)]$

$\boxed{y-2=2(x+1)}$

6. Passes through $(4,-7)$ and parallel to the line with equation $3x+y-9=0$.

$y-(-7)=-3(x-4)$

$\boxed{y+7=-3(x-4)}$

7. Passes through $(-3,6)$ and perpendicular to the line with equation $y=\frac{1}{3}x+4$.

$y-6=-3[x-(-3)]$

$\boxed{y-6=-3(x+3)}$

Find the slope and y-intercept of the following lines.(8-10)

8. $y=\frac{2}{5}x-1$

slope is $\frac{2}{5}$
y-intercept is -1

9. $2x+3y+6=0$

$y=-\dfrac{2}{3}x-2$

slope is $-\frac{2}{3}$
y-intercept is -2

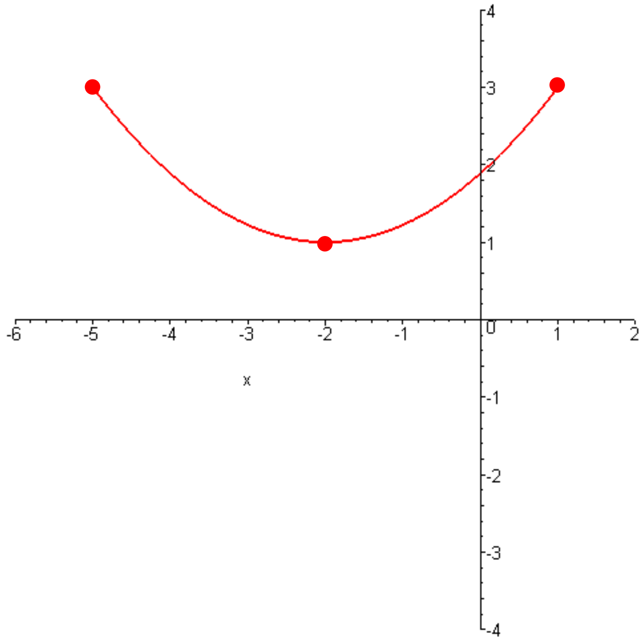
10. $3x-9=0$

$x=3$

slope is undefined
no y-intercept

Use the graph of the function f to graph the following functions. Use the graph you get to determine the domain and range of the given function.(11-16)

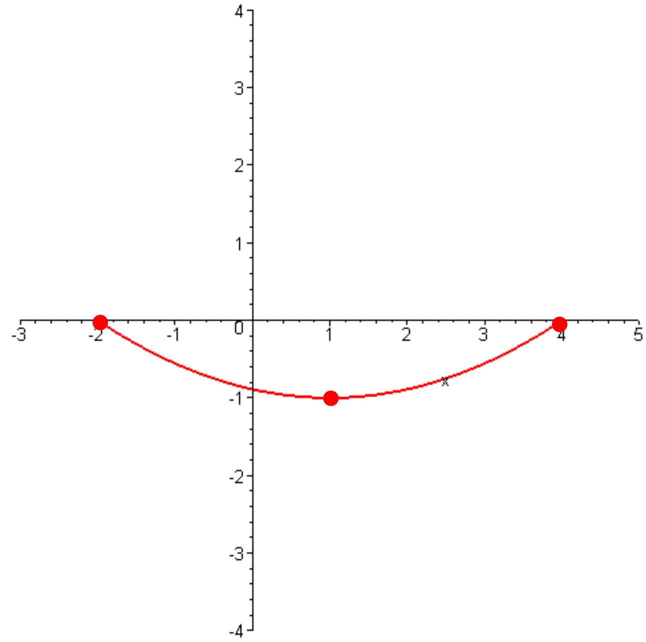
11. $g(x) = f(x+2) + 3$



Domain: $[-5, 1]$

Range: $[1, 3]$

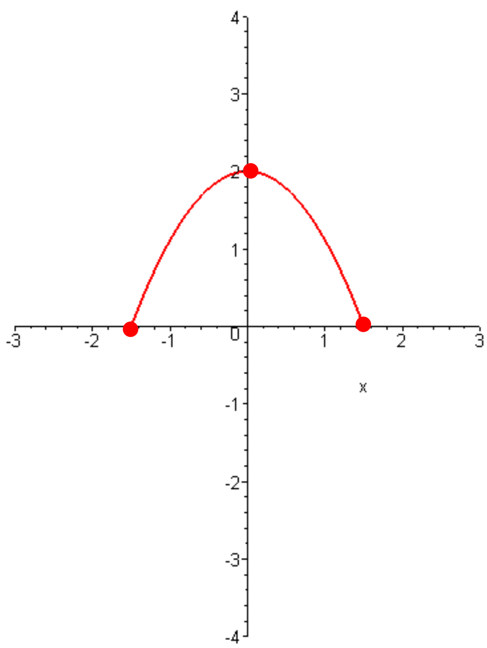
12. $h(x) = \frac{1}{2} f(x-1)$



Domain: $[-2, 4]$

Range: $[-1, 0]$

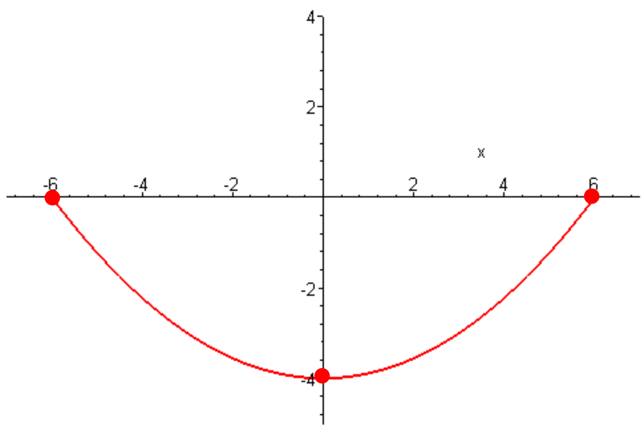
13. $j(x) = -f(2x)$



Domain: $[-\frac{3}{2}, \frac{3}{2}]$

Range: $[0, 2]$

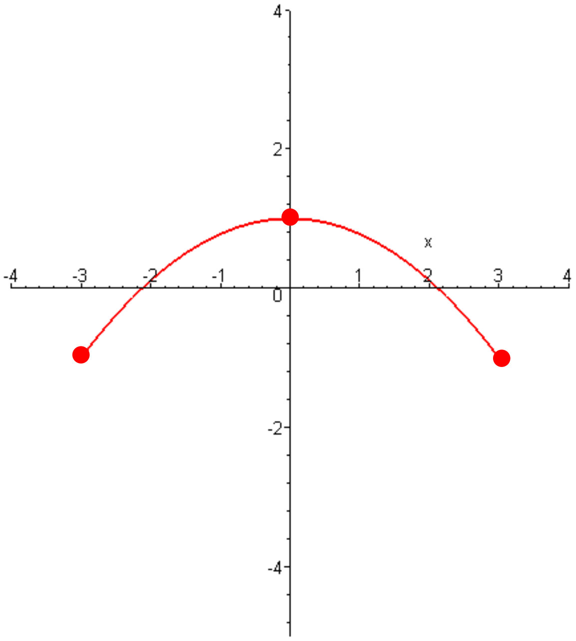
14. $k(x) = 2f(\frac{1}{2}x)$



Domain: $[-6, 6]$

Range: $[-4, 0]$

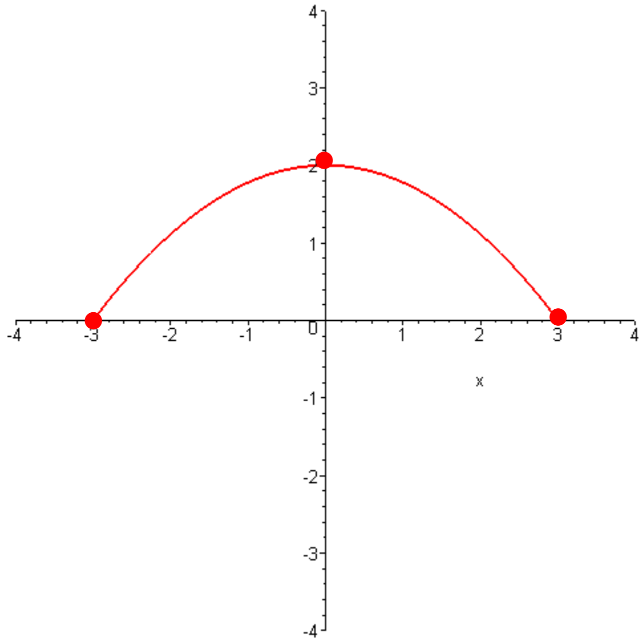
15. $l(x) = -f(-x) - 1$



Domain: $[-3,3]$

Range: $[-1,1]$

16. $m(x) = |f(x)|$

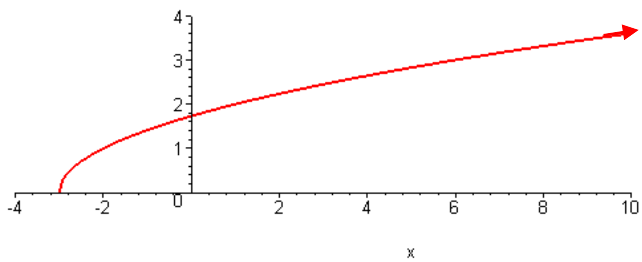


Domain: $[-3,3]$

Range: $[0,2]$

Start with the graph of the square root function, $f(x) = \sqrt{x}$*, and use transformations to graph the given function. Use the graph you get to determine the domain and range of the given function.(17-20)*

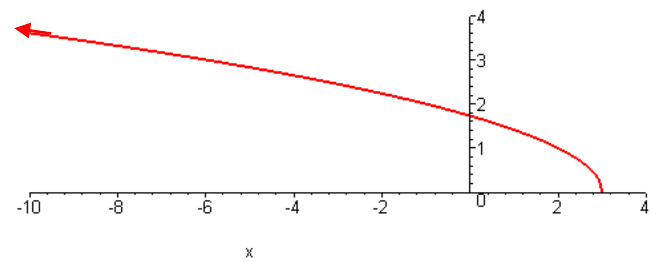
17. $g(x) = \sqrt{x+3}$



Domain: $[-3,\infty)$

Range: $[0,\infty)$

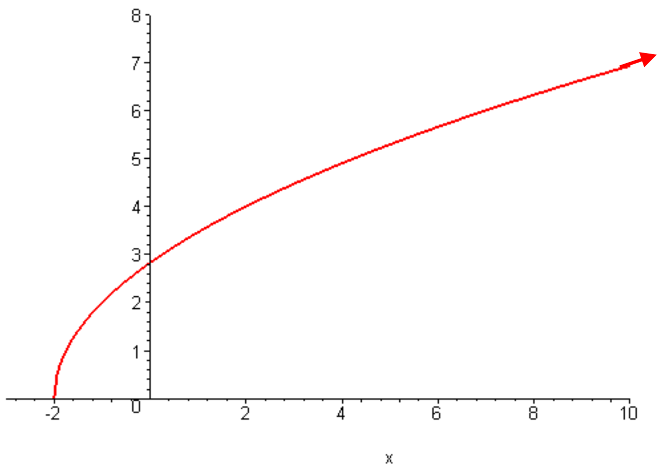
18. $h(x) = \sqrt{3-x}$



Domain: $(-\infty,3]$

Range: $[0,\infty)$

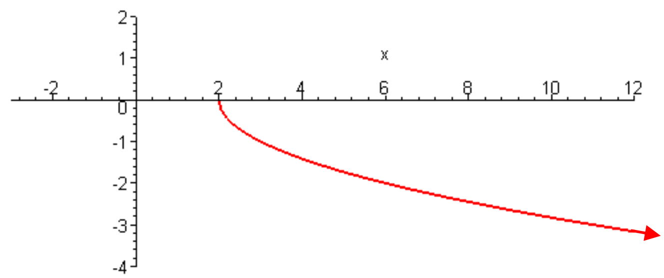
19. $j(x)=2\sqrt{x+2}$



$Domain:[-2,\infty)$

$Range:[0,\infty)$

20. $k(x)=-\sqrt{x-2}$



$Domain:[2,\infty)$

$Range:(-\infty,0]$

Express the domain of the following functions in interval notation, if possible.(21-24)

21. $f(x)=\dfrac{4}{x-7}$

$\boxed{(-\infty,7),(7,\infty)}$

22. $g(x)=\sqrt{8-2x}$

$8-2x\ge 0$

$-2x\ge -8$

$x\le 4$

$\boxed{(-\infty,4]}$

23. $h(x)=\dfrac{\sqrt{x-2}}{x-5}$

$x-2\ge 0$

$x\ge 2$

$x\ne 5$

$\boxed{[2,5),(5,\infty)}$

24. $j(x)=\sqrt{1-x}+\sqrt{x+5}$

$1-x\ge 0$

$-x\ge -1$

$x\le 1$

$x+5\ge 0$

$x\ge -5$

$-5\le x\le 1$

$\boxed{[-5,1]}$

25. For $f(x)=x^2-2x+1$ and $g(x)=x-1$, find $f+g, f-g, fg, \dfrac{f}{g}, f\circ g,$ and $g\circ f$; simplify whenever possible.

$(f+g)(x)=f(x)+g(x)$

$=x^2-2x+1+x-1$

$=\boxed{x^2-x}$

$(f-g)(x)=f(x)-g(x)$

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

$=\boxed{x^2-3x+2}$

$$(fg)(x) = f(x)\cdot g(x)$$
$$= (x^2-2x+1)(x-1)$$
$$= x^3-2x^2+x-x^2+2x-1$$
$$= \boxed{x^3-3x^2+3x-1}$$

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$$
$$= \frac{(x^2-2x+1)}{(x-1)}$$
$$= \boxed{x-1, x\neq 1}$$

$$(f\circ g)(x) = f(g(x))$$
$$= f(x-1)$$
$$= (x-1)^2-2(x-1)+1$$
$$= x^2-2x+1-2x+2+1$$
$$= \boxed{x^2-4x+4}$$

$$(g\circ f)(x) = g(f(x))$$
$$= g(x^2-2x+1)$$
$$= x^2-2x+1-1$$
$$= \boxed{x^2-2x}$$

26. Find a formula for $f^{-1}(x)$ for the following one-to-one functions.

a) $f(x) = 4x-3$

$$y = 4x-3$$
$$x = 4y-3$$
$$4y = x+3$$
$$y = \frac{x+3}{4}$$
$$\boxed{f^{-1}(x) = \frac{x+3}{4}}$$

b) $f(x) = 8x^3+1$

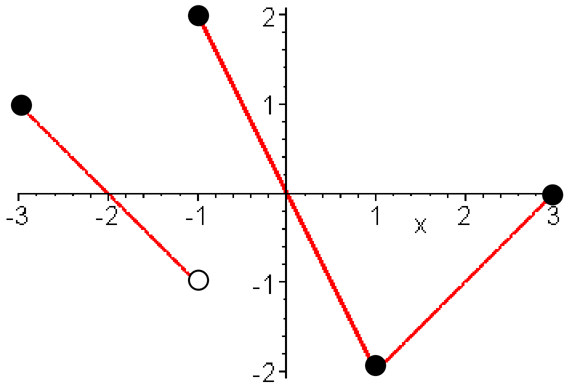
$$y = 8x^3+1$$
$$x = 8y^3+1$$
$$8y^3 = x-1$$
$$y^3 = \frac{x-1}{8}$$
$$y = \sqrt[3]{\frac{x-1}{8}}$$
$$\boxed{f^{-1}(x) = \frac{\sqrt[3]{x-1}}{2}}$$

c) $f(x) = \frac{2}{x}+5$

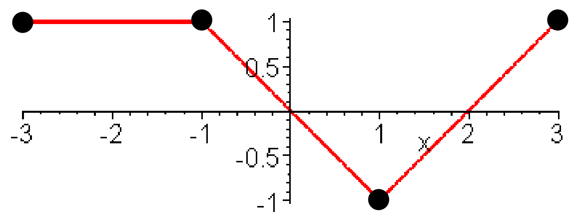
$$y = \frac{2}{x}+5$$
$$x = \frac{2}{y}+5$$
$$\frac{2}{y} = x-5$$
$$\frac{y}{2} = \frac{1}{x-5}$$
$$y = \frac{2}{x-5}$$
$$\boxed{f^{-1}(x) = \frac{2}{x-5}}$$

27. Using the graphs of the functions *f* and *g*, which consist of line segments, answer the following:

Graph of f



Graph of g



a) $(f+g)(-1)$ **b)** $(f-g)(1)$ **c)** $(fg)(2)$ **d)** $\left(\frac{f}{g}\right)(0)$ **e)** Solve $f(x)g(x)=0$.

$\boxed{3}$ $\boxed{-1}$ $\boxed{0}$ $\boxed{undefined}$ $\boxed{x=-2,0,3,2}$

f) $(f\circ g)(-1)$ **g)** $(g\circ f)(-1)$ **h)** $(f\circ g\circ f)(-3)$ **i)** Solve $(f\circ g)(x)=2$.

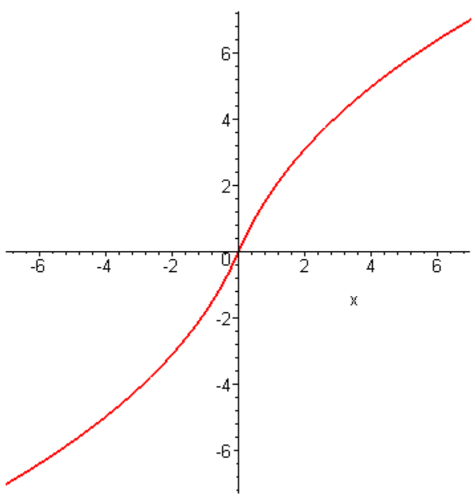
$\boxed{-2}$ $\boxed{0}$ $\boxed{2}$

$g(x)=-1$

$\boxed{x=1}$

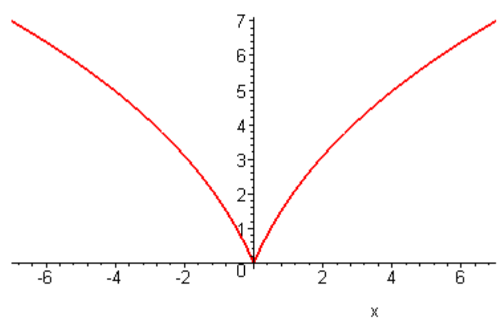
Use the horizontal line test to determine if the graph is of a function which has an inverse function.(28-29)

28.



Is a one-to-one function.

29.



Is not a one-to-one function.

30. Graph the piecewise defined function $f(x)=\begin{cases} x^2-1; x<-1 \\ \sqrt{x+1}; -1\le x\le 3 \\ -x \;\; ; x>3 \end{cases}$.