

## Functions Practice Quiz

Evaluate each function.

1)  $h(n) = n^2 - 5$ ; Find  $h(2)$

$$\begin{aligned} h(2) &= (2)^2 - 5 \\ &= 4 - 5 \\ &= \boxed{-1} \end{aligned}$$

3)  $g(x) = x^2 - 3$ ; Find  $g(5)$

$$\begin{aligned} g(5) &= 5^2 - 3 \\ &= 25 - 3 \\ &= \boxed{22} \end{aligned}$$

5)  $h(n) = n^2 + 3$ ; Find  $h(1+n)$

$$\begin{aligned} h(1+n) &= (1+n)^2 + 3 \\ &= (1+n)(1+n) + 3 \\ &= 1 + 2n + n^2 + 3 \\ &= \boxed{4 + 2n + n^2} \end{aligned}$$

7)  $w(x) = 2x - 3$ ; Find  $w(z+3)$

$$\begin{aligned} w(z+3) &= 2(z+3) - 3 \\ &= 2z + 6 - 3 \\ &= \boxed{2z + 3} \end{aligned}$$

Perform the indicated operation.

9)  $h(x) = x^2 + 3$   
 $g(x) = x + 2$   
Find  $(h-g)(8)$

$$\begin{aligned} h(8) &= 8^2 + 3 = 64 + 3 = \boxed{67} \\ g(8) &= 8 + 2 = \boxed{10} \\ 67 - 10 &= \boxed{57} \end{aligned}$$

2)  $w(t) = 3t^2 - 5$ ; Find  $w(8)$

$$\begin{aligned} w(8) &= 3(8)^2 - 5 \\ &= 3(64) - 5 \\ &= 192 - 5 \\ &= \boxed{187} \end{aligned}$$

4)  $k(a) = a^2 + 4a$ ; Find  $k(-10)$

$$\begin{aligned} k(-10) &= (-10)^2 + 4(-10) \\ &= 100 + -40 \\ &= \boxed{60} \end{aligned}$$

6)  $f(x) = 2x + 1$ ; Find  $f(x^2)$

$$\begin{aligned} f(x^2) &= 2(x^2) + 1 \\ &= \boxed{2x^2 + 1} \end{aligned}$$

8)  $g(n) = 2n$ ; Find  $g(4+n)$

$$\begin{aligned} g(4+n) &= 2(4+n) \\ &= \boxed{8 + 2n} \end{aligned}$$

10)  $g(x) = 2x - 2$

$h(x) = 3x + 1$

Find  $g(0) \div h(0)$ 

$$\begin{aligned} g(0) &= 2(0) - 2 = 0 - 2 = \boxed{-2} \\ h(0) &= 3(0) + 1 = 0 + 1 = \boxed{1} \\ \frac{-2}{1} &= \boxed{-2} \end{aligned}$$



11)  $h(n) = 3n + 1$   
 $g(n) = 3n^2 - 5$   
 Find  $(h + g)(-1)$

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

$$g(-1) = 3(-1)^2 - 5 = 3(1) - 5 = -2$$

$$-2 + -2 = \boxed{-4}$$

12)  $h(t) = 3t + 5$   
 $g(t) = 2t^2 - 2$   
 Find  $h(5) - g(5)$

$$h(5) = 3(5) + 5 = 15 + 5 = 20$$

$$g(5) = 2(5)^2 - 2 = 2(25) - 2 = 50 - 2 = 48$$

$$20 - 48 = \boxed{-28}$$

13)  $h(n) = 4n + 5$   
 $g(n) = 2n^3 + n$   
 Find  $h(2n) \div g(2n)$

$$h(2n) = 4(2n) + 5 = 8n + 5$$

$$g(2n) = 2(2n)^3 + (2n) = 2(8n^3) + 2n = 16n^3 + 2n$$

$$\frac{8n + 5}{16n^3 + 2n}$$

14)  $g(x) = x + 2$   
 $h(x) = x^3 - 5$   
 Find  $g(x^2) \div h(x^2)$

$$g(x^2) = x^2 + 2$$

$$h(x^2) = (x^2)^3 - 5 = x^6 - 5$$

$$\frac{x^2 + 2}{x^6 - 5}$$

15)  $f(x) = 2x - 4$   
 $g(x) = x^3 + 5$   
 Find  $f(2x) - g(2x)$

$$f(2x) = 2(2x) - 4 = 4x - 4$$

$$g(2x) = (2x)^3 + 5 = 8x^3 + 5$$

$$(4x - 4) - (8x^3 + 5) = 4x - 4 - 8x^3 - 5 = \boxed{4x - 9 - 8x^3}$$

16)  $h(a) = -4a + 2$   
 $g(a) = -3a^2 + a$   
 Find  $(h \cdot g)(y^2)$

$$h(y^2) = -4(y^2) + 2 = -4y^2 + 2$$

$$g(y^2) = -3(y^2)^2 + y^2 = -3y^4 + y^2$$

$$(-4y^2 + 2)(-3y^4 + y^2)$$

$$= 12y^6 - 4y^4 - 6y^4 + 2y^2$$

$$= \boxed{12y^6 - 10y^4 + 2y^2}$$

Find the inverse of each function.

17)  $f(x) = 3x - 1$

$$x = 3y - 1$$

$$x + 1 = 3y$$

$$\frac{x + 1}{3} = y$$

19)  $g(x) = \sqrt[3]{x} - 2$

$$x = \sqrt[3]{y} - 2$$

$$x + 2 = \sqrt[3]{y}$$

$$(x + 2)^3 = y$$

18)  $f(x) = 2 + (x - 2)^3$

$$x = 2 + (y - 2)^3$$

$$x - 2 = (y - 2)^3$$

$$\sqrt[3]{x - 2} = y - 2$$

$$\sqrt[3]{x - 2} + 2 = y$$

20)  $f(x) = -\frac{2}{-x - 3} + 2$

$$x = \frac{-2}{-y - 3} + 2$$

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

$$(-y - 3)(x - 2) = -2$$

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

$$-y = \frac{-2}{x - 2} + 3$$

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



State if the given functions are inverses.

21)  $f(x) = -\frac{2}{x-2} - 1$

$g(x) = \frac{4}{x-2} + 1$

$$\frac{-2}{\left(\frac{4}{x-2}\right) - 2} - 1 = \frac{-2}{\left(\frac{4}{x-2} + \frac{x-2}{x-2}\right) - 2}$$

$$= \frac{-2}{\frac{4+x-2}{x-2} - 2} = \frac{-2}{\frac{x+2}{x-2} - 2} = \frac{-2}{\frac{x+2 - 2(x-2)}{x-2}} = \frac{-2}{\frac{x+2 - 2x + 4}{x-2}} = \frac{-2}{\frac{-x+6}{x-2}}$$

23)  $f(x) = 2(x+1)^3$   
 $g(x) = \frac{-2 + \sqrt[3]{4x}}{2}$

$$\frac{-2 + \sqrt[3]{4(2(x+1)^3)}}{2}$$

**NO**

22)  $f(x) = \sqrt[5]{-x+1}$   
 $h(x) = -x^5 + 1$

$$\sqrt[5]{-(-x^5+1)+1} = \sqrt[5]{x^5 - 1 + 1} = \sqrt[5]{x^5} = x$$

**YES**

24)  $g(x) = \frac{5x+20}{7}$

$f(x) = -2 + \frac{1}{3}x$

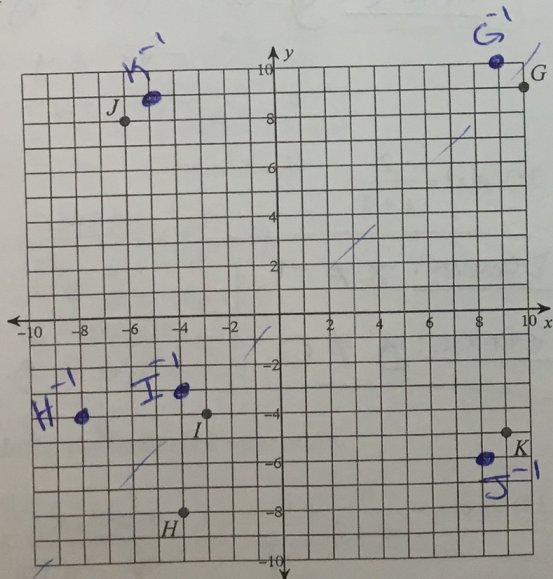
$$-2 + \frac{1}{3}\left(\frac{5x+20}{7}\right) = -2 + \frac{5x+20}{21}$$

$$= \frac{-42 + 5x + 20}{21} = \frac{-22 + 5x}{21}$$

**NO**

Graph the inverse of each function.

25)



ORIGINAL  
 G: (10, 9)

H: (-4, -8)

I: (-3, -4)

J: (-6, 8)

K: (9, -5)

INVERSE

$G^{-1}: (9, 10)$

$H^{-1}: (-8, -4)$

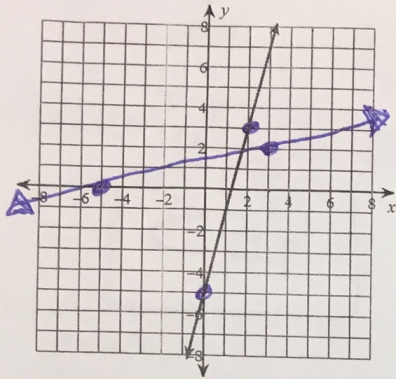
$I^{-1}: (-4, -3)$

$J^{-1}: (8, -6)$

$K^{-1}: (-5, 9)$



26)

ORIGINAL

$(2, 3)$

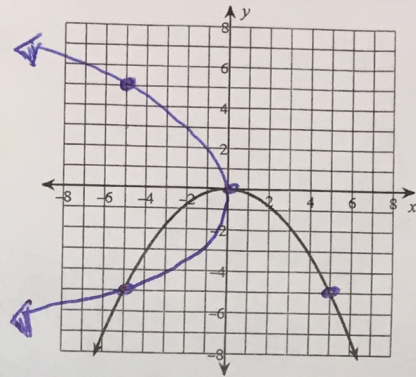
$(0, -5)$

INVERSE

$(3, 2)$

$(-5, 0)$

27)

ORIGINAL

$(0, 0)$

$(-5, -5)$

$(5, -5)$

INVERSE

$(0, 0)$

$(-5, -5)$

$(-5, 5)$

Find the domain and range of each function.

28)  $f(x) = \sqrt[5]{x} + 2$

DOMAIN:  $\mathbb{R}$ RANGE:  $\mathbb{R}$ INVERSE:

$x = \sqrt[5]{y} + 2$

$x - 2 = \sqrt[5]{y}$

$(x - 2)^5 = y$

29)  $g(x) = -(x - 2)^8$

DOMAIN:  $\mathbb{R}$ RANGE:  $y \leq 0$ INVERSE:

$x = -(y - 2)^8$

$\sqrt[8]{-x} = -(y - 2)$

$-\sqrt[8]{-x} = y - 2$

$-\sqrt[8]{-x} + 2 = y$

30)  $f(x) = \frac{3}{x-2} + 2$

DOMAIN:  $x \neq 2$ RANGE:  $y \neq 2$ INVERSE:

$x = \frac{3}{y-2} + 2$

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

$(y-2)(x-2) = 3$

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

$y = \frac{3}{x-2} + 2$

31)  $g(x) = \frac{2}{x+1}$

DOMAIN:  $x \neq -1$ RANGE:  $y \neq 0$ INVERSE:

$x = \frac{2}{y+1}$

$x(y+1) = 2$

$y+1 = \frac{2}{x}$

$y = \frac{2}{x} - 1$

32)  $f(x) = \frac{-4 - \sqrt[6]{4x}}{2}$

DOMAIN:  $x \geq 0$ RANGE:  $\mathbb{R}$ INVERSE:

$x = \frac{-4 - \sqrt[6]{4y}}{2}$

$2x = -4 - \sqrt[6]{4y}$

$2x + 4 = -\sqrt[6]{4y}$

$-2x - 4 = \sqrt[6]{4y}$

$(-2x - 4)^6 = 4y$

$\frac{(-2x - 4)^6}{4} = y$

33)  $h(x) = -\frac{4}{-x+2} + 1$

DOMAIN:  $x \neq 2$ RANGE:  $y \neq 1$ INVERSE:

$x = \frac{-4}{-y+2} + 1$

$x - 1 = \frac{-4}{-y+2}$

$(-y+2)(x-1) = -4$

$-y+2 = \frac{-4}{x-1}$

$-y = \frac{-4}{x-1} - 2$

$y = \frac{4}{x-1} + 2$