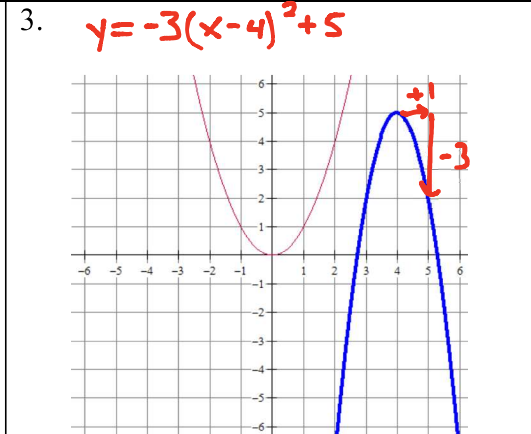


**REVIEW**

**Identify the transformations.**      **Write the equation given the parent  $y = x^3$ .**      **Write the equation given the parent function  $y = x^2$ .**

1.  $y = 2e^{(3-x)} - 4$   
 $y = 2e^{-(x-3)} - 4$   
 Translation: right 3 & Down 4  
 Scale: Stretch vertically by 2.  
 Reflection: About y-axis

2. Vertical reflection about the x-axis, horizontal stretch of 4, vertical shift up 2.  
 $y = -(\frac{1}{4}x)^3 + 2$

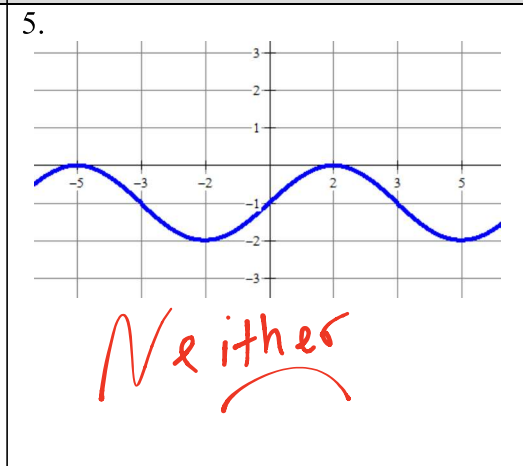


**Determine if the function is even, odd, or neither. ALGEBRAICALLY**

**Determine if the function is even, odd, or neither. GRAPHICALLY**

**For #6, use the following tables.**

4.  $f(x) = \frac{x^3+x}{x^3-x}$   
 Even  $(-x, y)$   
 $y = \frac{(-x)^3+(-x)}{(-x)^3-(-x)}$   
 $y = \frac{-x^3-x}{-x^3+x}$   
 $y = \frac{x^3+x}{x^3-x}$



6.

x	f(x)	x	g(x)
-5	5	-5	4
-2	9	-2	10
0	0	0	-2
4	6	4	8

a.  $(g + f)(4) = g(4) + f(4) = 8 + 6 = 14$   
 b.  $(f \circ g)(0) = f(g(0)) = f(-2) = 9$

**For 7-12, use the following functions. State the domain when appropriate.**  
 $f(x) = \frac{x^2 - 1}{\sqrt{2x + 9}}$ , D:  $x > -\frac{9}{2}$        $g(x) = 3x^2 - 4x$ , D:  $\mathbb{R}$        $h(x) = 5 - 3x$ , D:  $\mathbb{R}$

7.  $h - g = h(x) - g(x)$   
 $= (5 - 3x) - (3x^2 - 4x)$   
 $= -3x^2 + x + 5$   
 DOMAIN:  $\mathbb{R}$   
 $(-\infty, \infty)$

8.  $f(g(-2)) = \frac{(g(-2))^2 - 1}{\sqrt{2(g(-2)) + 9}}$   
 $= \frac{(20)^2 - 1}{\sqrt{2(20) + 9}} = \frac{400 - 1}{\sqrt{40 + 9}} = \frac{399}{\sqrt{49}} = \frac{399}{7} = 57$

9.  $(\frac{g}{h})(x) = \frac{g(x)}{h(x)} = \frac{3x^2 - 4x}{5 - 3x}$   
 Denom  $\neq 0$   
 $5 - 3x \neq 0$   
 $5 \neq 3x$   
 $\frac{5}{3} \neq x$   
 DOMAIN:  $\mathbb{R}, x \neq \frac{5}{3}$   
 $(-\infty, \frac{5}{3}) \cup (\frac{5}{3}, \infty)$

10.  $(g + h)(4) = g(4) + h(4)$   
 $= (32) + (-7) = 25$   
 $g(4) = 3(4)^2 - 4(4) = 3(16) - 16 = 48 - 16 = 32$   
 $h(4) = 5 - 3(4) = 5 - 12 = -7$

11.  $(fh)(8) = f(8) \cdot h(8)$   
 $= (\frac{63}{5}) \cdot (-19) = -\frac{1197}{5}$   
 $f(8) = \frac{8^2 - 1}{\sqrt{2(8) + 9}} = \frac{64 - 1}{\sqrt{16 + 9}} = \frac{63}{\sqrt{25}} = \frac{63}{5}$   
 $h(8) = 5 - 3(8) = 5 - 24 = -19$

12.  $g \circ h = 3h^2 - 4h$   
 $= 3(5 - 3x)^2 - 4(5 - 3x)$   
 $= 3(25 - 30x + 9x^2) - 20 + 12x$   
 $= 75 - 90x + 27x^2 - 20 + 12x$   
 $(g \circ f) = 27x^2 - 78x + 55$   
 DOMAIN:  $\mathbb{R}$   
 $(-\infty, \infty)$

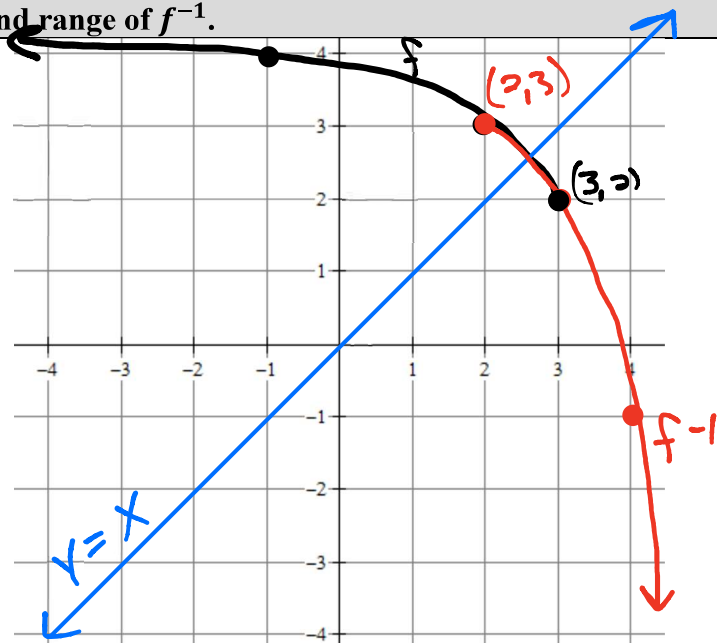
Alternate method than notes

Graph  $f$  and verify that  $f$  is one-to-one function. Find  $f^{-1}$  and add the graph of  $f^{-1}$  and the line  $y = x$  to the graph  $f$ . State the domain and range of  $f$  and the domain and range of  $f^{-1}$ .

17.  $f(x) = \sqrt{3-x} + 2$   
 $f(x) = \sqrt{-(x-3)} + 2$   
 $x = \sqrt{3-y} + 2$   
 $x-2 = \sqrt{3-y}$   
 $(x-2)^2 = 3-y$   
 $(x-2)^2 - 3 = -y$   
 $-(x-2)^2 + 3 = y$

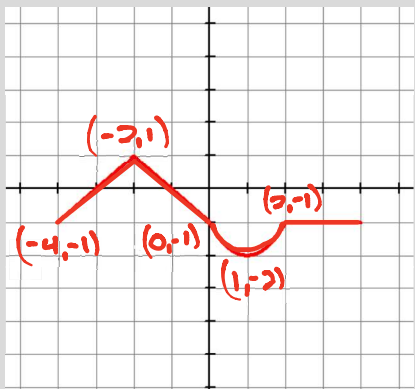
$f$   
 D:  $(-\infty, 3]$   
 R:  $[2, \infty)$

$f^{-1}$   
 D:  $[2, \infty)$   
 R:  $(-\infty, 3]$



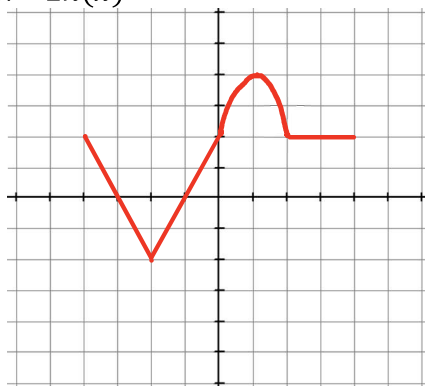
APPLICATION

Given the  $h(x)$  is shown below:

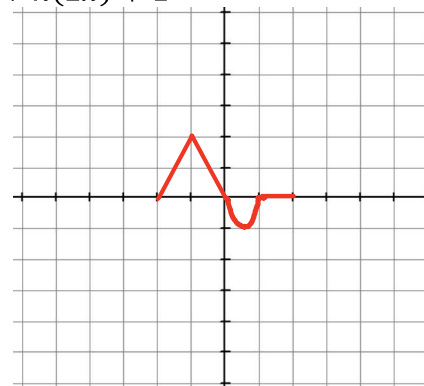


Sketch a graph of the following:

18.  $-2h(x)$



19.  $h(2x) + 1$



20. Describe the transformations from the parent function  $f(x)$  to  $-3f(x+2) - 1$ .

Reflect over x-axis  
 Stretch vertically by 3  
 Translate left 2 and down 1

21. Given  $g(x) = \frac{A}{x} + \frac{8}{x^2}$  If  $g(-1) = 0$ , then find  $A$ .

$0 = \frac{A}{-1} + \frac{8}{(-1)^2}$   
 $0 = -A + 8$   
 $A = 8$

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

↑ MISTAKE!!

a. Sketch  $f^{-1}(x)$ .

b. Write the equations for  $f^{-1}(x) = \begin{cases} \sqrt{(x-1)} - 1, & -3 \leq x < 1 \\ -x, & 1 \leq x \leq 5 \end{cases}$

c. Find the Domain and Range of  $f^{-1}(x)$ .

D:  $[-3, 5]$ , R:  $[-5, 1]$

