1. Given the original function f(x) describe all the transformations that would occur to g(x):

a. $f(x) = \sqrt{x}$ $g(x) = \sqrt{4x}$

Horizontal shrink by 4

b. $f(x) = e^x$ $g(x) = -5e^x$

Reflect over X-axis
Vertical Stretch by 5

c. $f(x) = x^3$ $g(x) = (-x + 3)^3 + 7$

Reflect over y-axis
Left 3
Up 7

d. $f(x) = |x|$ $g(x) = 0.1|-x - 1| - 5$

Vertical shrink by 10
Reflect over y-axis
Right 1
Down 5

e. $f(x) = \ln(x)$ $g(x) = -\ln\left(\frac{x}{2}\right)$

Reflect over X-axis
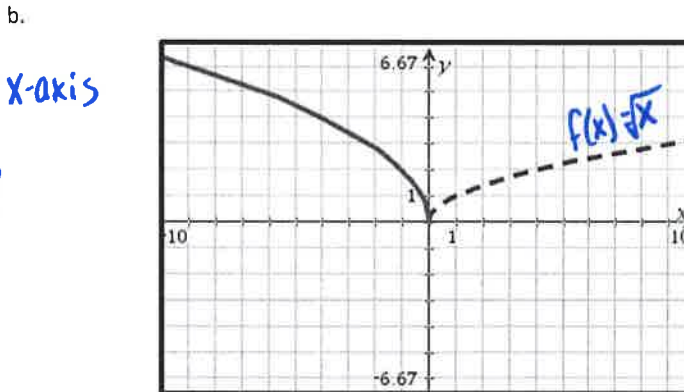Horizontal Stretch by 2

f. $f(x) = \sqrt[3]{x}$ $g(x) = -\sqrt[3]{-x}$

Reflect over X-axis
Reflect over y-axis

2. Based in the graph of the original function (dashed lines) write an equation that represents the graph of the transformed function (**bold lines**).
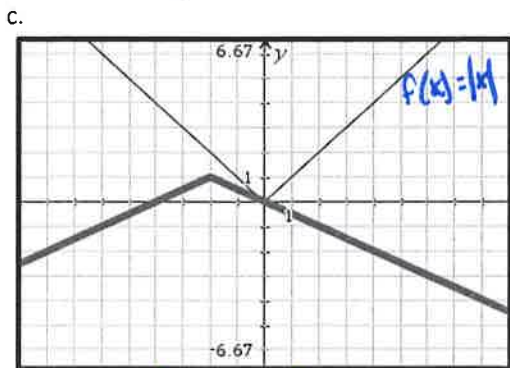
a.
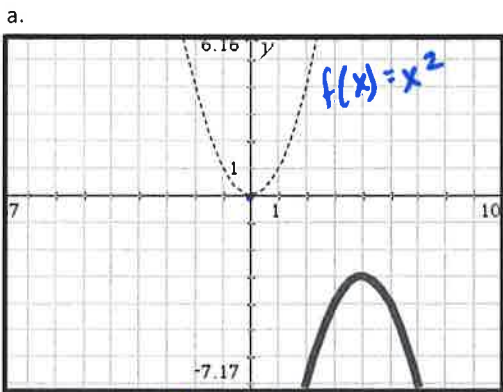
Ref. over x-axis
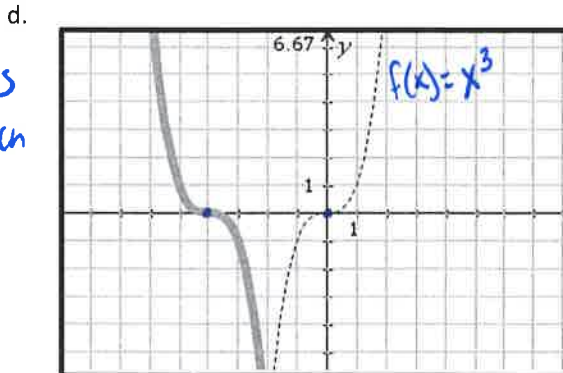Down 3
Right 4

$g(x) = -(x-4)^2 - 3$

b.

Ref. over y-axis
Vertical Stretch by 2

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

c.

Ref. over x-axis
Horizontal Stretch by 2
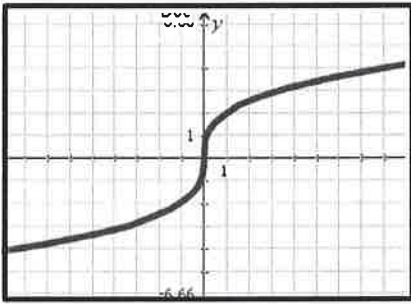Left 2
up 1

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

d.
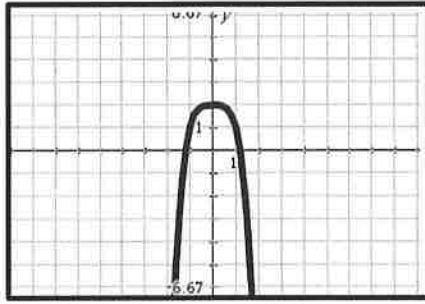

Ref. over x-axis
left 4

$g(x) = -(x+4)^3$

3. Based on the given graph determine if the function is **even, odd** or **neither**.
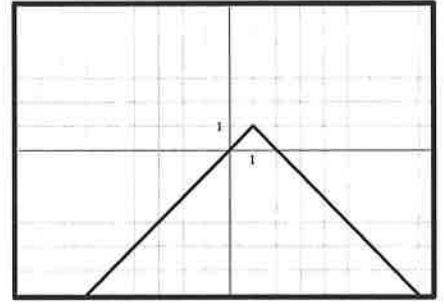
a.

odd (double reflect)

b.

Even (y-axis symmetry)

c.

Neither

4. Determine if the function is **even, odd** or **neither**. __Justify your answer either algebraically or in sentence form.__

a. $f(x) = -5x^3 + 9|x|$

$f(-x) = -5(-x)^3 + 9|-x|$

$\quad = 5x^3 + 9|x|$

Neither

b. $f(x) = 9(x+2)(x-2) + 5 \rightarrow 9(x^2-4) + 5$

$f(-x) = 9(-x)^2 - 31 \qquad 9x^2 - 36 + 5$

$\quad = 9x^2 - 31$

even

c. $f(x) = -x^5 - 9x^3 + \dfrac{1}{x}$

$f(-x) = -(-x)^5 - 9(-x)^3 + \dfrac{1}{-x}$
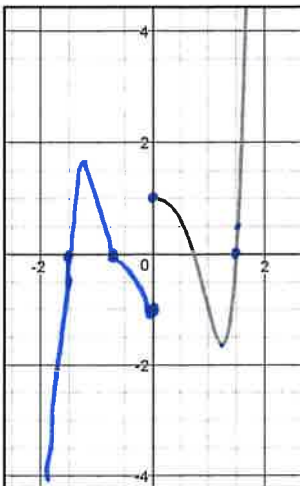
$\quad = x^5 + 9x^3 - \dfrac{1}{x}$

odd

d. $f(x) = \sqrt{3x^4 + 2x^2 + 3}$

$f(-x) = \sqrt{3(-x)^4 + 2(-x)^2 + 3}$

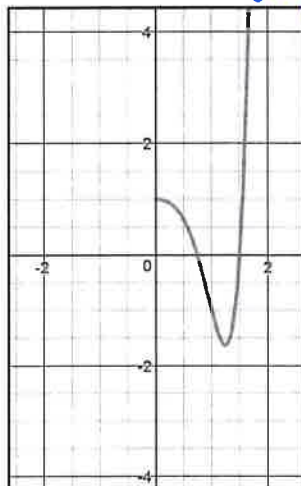$\quad = \sqrt{3x^4 + 2x^2 + 3}$ **even**

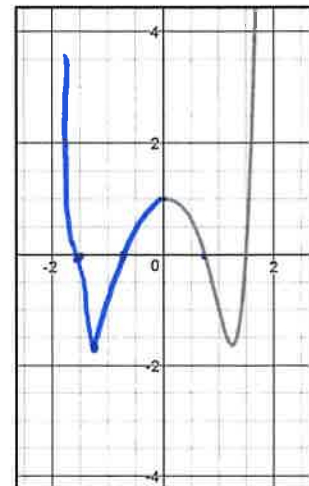5. Complete the graph so that the function is the indicated type.
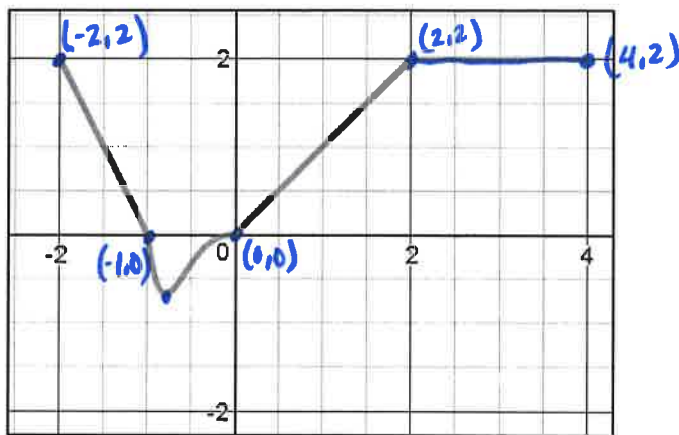
a. Odd

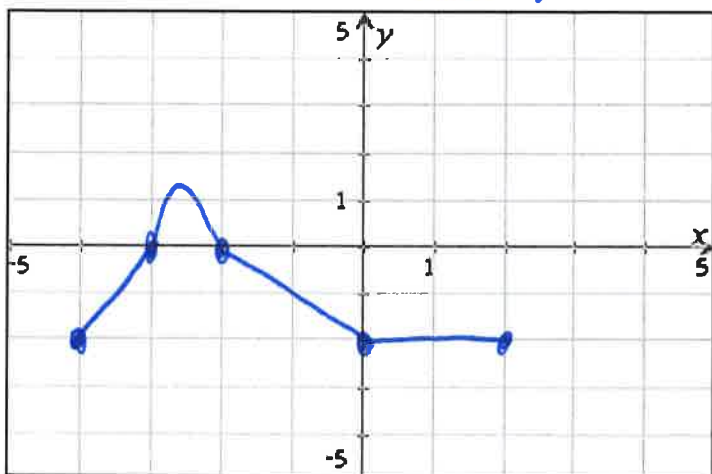
b. Neither ✱ answers vary

c. Even

6. A function, *f(x)*, is graphed below. Graph *g(x)* correctly based on the transformations provided.

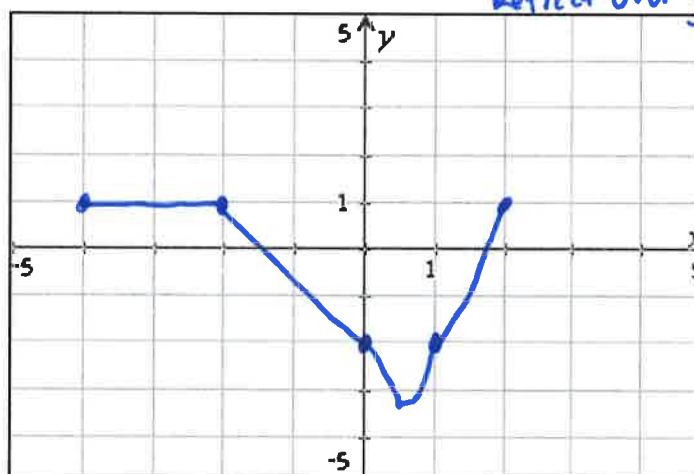a. $g(x) = -f(x+2)$ **Reflect over x, left 2**

$(x,y) \longrightarrow (x-2, -y)$

$(-2,2) \longrightarrow (-4, -2)$

$(-1,0) \longrightarrow (-3, 0)$

$(0,0) \longrightarrow (-2, 0)$

$(2,2) \longrightarrow (0, -2)$

$(4,2) \longrightarrow (2, -2)$

b. $g(x) = 1.5f(-x) - 2$ **Vertical stretch, down 2, Reflect over y**

$(x,y) \longrightarrow (-x, 1.5y-2)$

$(-2,2) \longrightarrow (2, 1)$

$(-1,0) \longrightarrow (1, -2)$

$(0,0) \longrightarrow (0, -2)$

$(2,2) \longrightarrow (-2, 1)$

$(4,2) \longrightarrow (-4, 1)$