Unit 1 Exercises KEY

1. If (1,1) is a point on the graph of y=f(x), what must be a point on the graph of the following?

a) y= f(x)- 3

(1,-2)

b) y= f(x+5)

(-4, 1)

c) y= -f(-x+1)

(0,-1)

d) y+2= f(-x)

(-1, -1)

2. The point (8,-4) is on the graph of y=f(x). If the transformation y=f(4+2x) is applied, then the new point is

A. (20, -4)
B. (0, -4)
C. (2, -4)
D. (0, 0)

$y=f(2(x+2))$

3. The domain of f(x) is x<2. If the transformation g(x)= f(x+5)-3 is applied, then the new domain of the function is

A. x< -3
B. x< -1
C. x> -3
D. x>-1

4. Change each equation into the form of y=a f[b(x-c)]+d.

a) y+3 = f(x+2) -1

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

b) 2y-4 = f(3x-6)

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

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

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

5. The graph of y = f (x) is compressed horizontally by a factor of $\frac{1}{5}$. Determine the equation of the transformed graph.

A. $y = \frac{1}{5}f(x)$
B. $y = 5f(x)$
C. $y = f(\frac{1}{5}x)$
D. $y = f(5x)$

6. Determine the inverse of each function.

a. $f(x) = 2x^3 + 3$

$f^{-1}(x) = 2y^3 + 3$

$2y^3 = x - 3$

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

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

b. $f(x) = \frac{1}{x} - 5$

$x = \frac{1}{y} - 5$

$xy = 1 - 5y$

$xy + 5y = 1$

$y(x+5) = 1$

$y = \frac{1}{x+5}$

$\therefore f^{-1}(x) = \frac{1}{x+5} \quad (x \neq -5)$

7. Find $f^{-1}(x)$ given $f(x) = x^3 + 2$

A. $\sqrt[3]{x-2}$
B. $\sqrt[3]{x+2}$
C. $\sqrt[3]{x} - 2$
D. $\sqrt[3]{x} + 2$

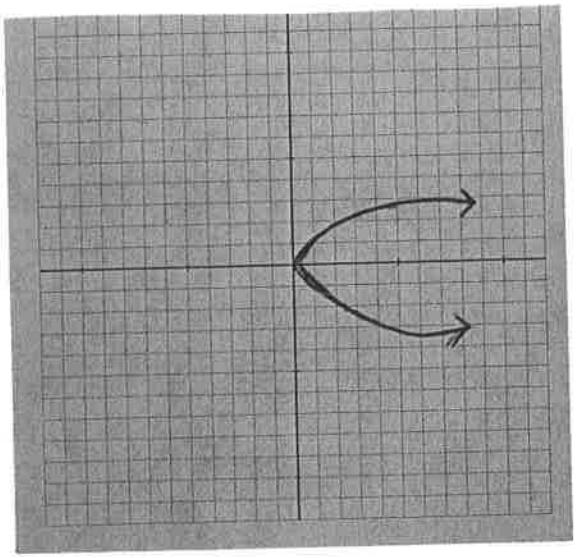
$x = y^3 + 2$

$y^3 = x - 2$

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

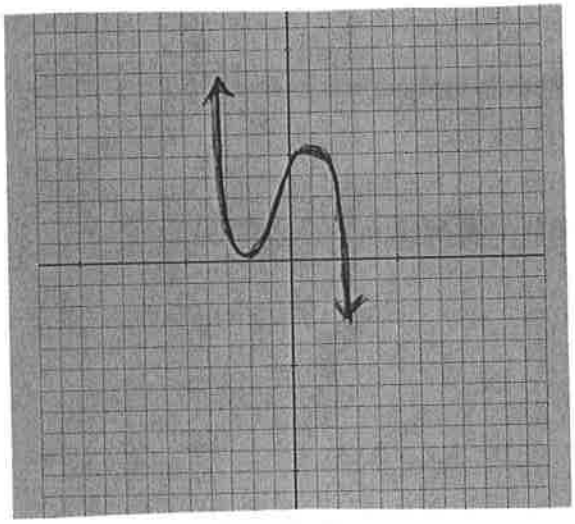
8. State whether each of the following relations is a function, a one-to-one function, or neither.

a)



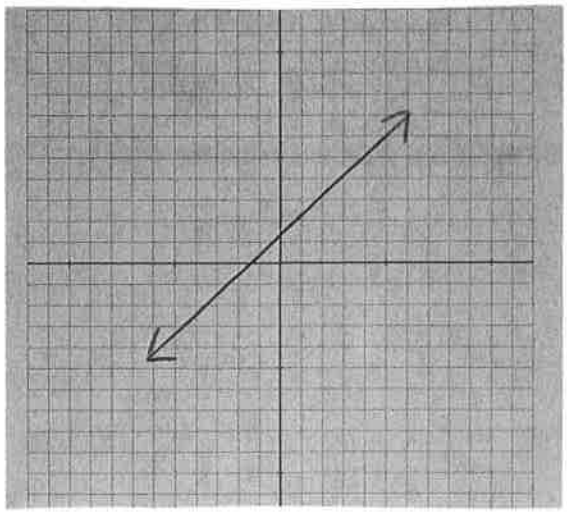
∴ Neither

b)



∴ function

c)



∴ one to one

9. Compute each expression, given that functions f,g,h, and k are defined as follows:

f(x)= 3x -4 g(x)=x^3 h(x)= x+2 k(x)=7

a) (f+h)(x)=

$3x-4+x+2 = 4x-2$

b)($\frac{gh}{k}$)(2)=

$$\frac{x^3(x+2)}{7} = \frac{2^3(2+2)}{7} = \frac{8(4)}{7} = \frac{32}{7}$$

10. Given f(x)=x^2 -5; g(x)=$\sqrt{x}$, find each composite function and its domain.

a) (f° g)(x)=

$f(g(x)) = (\sqrt{x})^2 - 5$

$= x - 5$

∴ Domain : $g(x) \rightarrow \boxed{x \geq 0}$

b) (g ° f)(x)=

$g(f(x)) = \sqrt{x^2-5}$

∴ Domain : $g(x) \rightarrow x \geq 0$

$(g \circ f)(x) \rightarrow x^2-5 > 0$

$x^2 > 5$

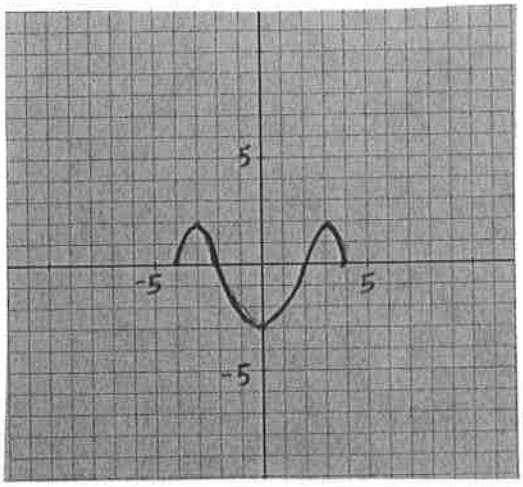
$x \geq \pm\sqrt{5}$

$\boxed{\therefore x \geq \sqrt{5}}$

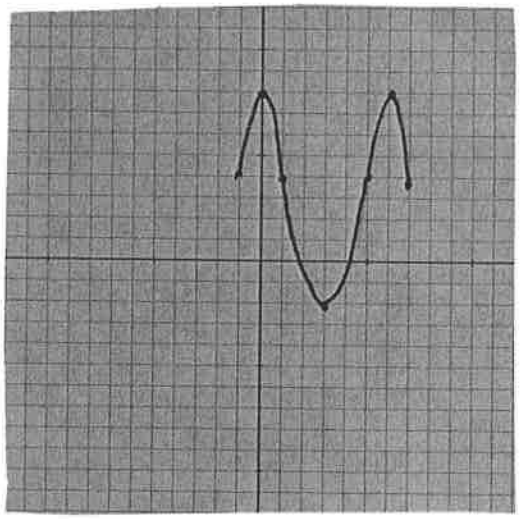
11. Which equation represents the graph of y=f(x) after it is reflected in the line y=x?

A. y= f^{-1} (x)
B. y= -f(x)
C. y= f(-x)
D. y= $\frac{1}{f(x)}$

12. The graph of y= f(x) is given below.



a) Sketch the graph of y=2f(x-3)+4.



b) Sketch the graph of y= 2|f(x)| +1.