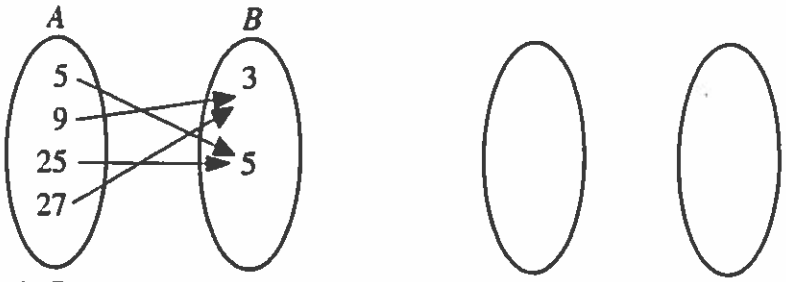
Assignment

1. The arrow diagram shows a function from set A to set B.



a) Draw an arrow diagram (above right) which represents the inverse of this function.

b) Is the inverse of the function also a function?

2. Complete the table to describe the inverse of the function:

FUNCTION	INVERSE	Is the inverse a functio
divide by 3	_____	____
cube	_____	____
add 10, then multiply by 2	_____	____
square, then subtract 5	_____	____

3. Consider the function defined by the following set of ordered pairs.

$$\{(-2, 9),\ (-1, 7), (0, 5), (1, 3),\ (2, 1)\}$$

a) Describe the inverse of the function by a set of ordered pairs.

{(9,-2), (7,-1), (5,0), (3,1), (1,2)}

b) Is the inverse of the function also a function? Why?

yes - no repeated "x" values.

4. Consider the function defined by the following set of ordered pairs.

$$\{(-2, 1),\ (-1, -2), (0, -3), (1, -2),\ (2, 1),\}$$

a) Describe the inverse of the function by a set of ordered pairs.

{(1,-2), (-2,-1), (-3,0), (-2,1), (1,2)}

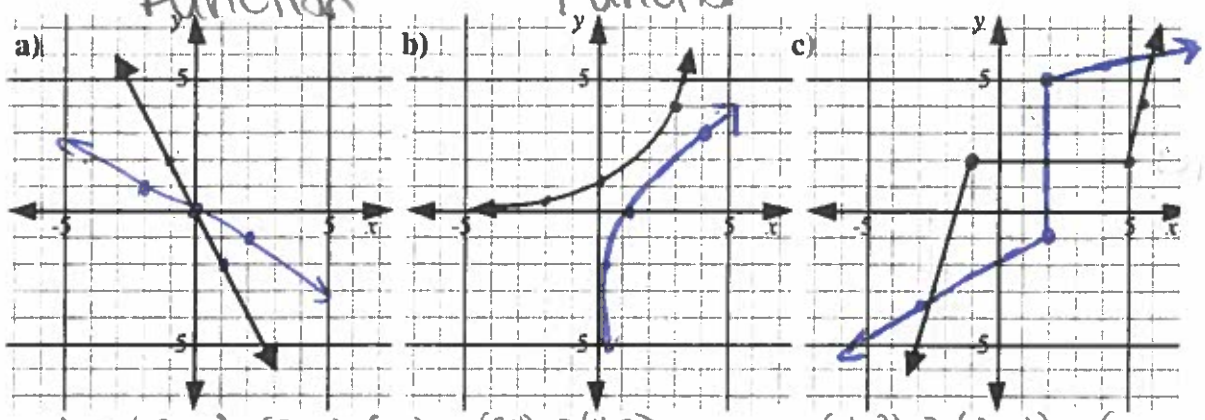
b) Is the inverse of the function also a function? Why?

no

→ repeated x values (1,-2)
(1,2)

5. Sketch the graph of the inverse of the function defined by the following graphs. Is the inverse a function? $x \leftrightarrow y$

Function Function Not function.



(-1,2) → (2,-1) (0,0)→(0,0) (3,4) → (4,3) (-1,2) → (2,-1) (-3.5,-3) → (-3,-3.5)

1,-2 → (-2,1) (0,1.2) → (1.2,0) (5,2) → (2,5)

(-2,0.5) → (0.5,-2) (5.5,4) → (4,5.5)

6. Find the inverse of the functions defined by the following equations.

BEDMAS

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

$x \leftrightarrow y$

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

$+2 \qquad +2$

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

$3x + 6 = y$

$y = 3x + 6$

b) $y = 6 - 8x$

$x \leftrightarrow y$

$x = 6 - 8y$

$\frac{x-6}{-8} = \frac{-8y}{-8}$

$\frac{x-6}{-8} = y$

$y = -\frac{1}{8}x + \frac{3}{4}$

c) $y = \frac{x-2}{5}$

$(5)x = \frac{y-2}{5}(5)$

$5x = y - 2$

$+2 \qquad +2$

$y = 5x + 2$

d) $3y = x - 7$

$3x = y - 7$

$3x + 7 = y$

e) $6x - \frac{1}{2}y + 4 = 0$

$6y - \frac{1}{2}x + 4 = 0$

$6y = \frac{\left(\frac{1}{2}x - 4\right)}{6}$

$y = \frac{1}{12}x - \frac{2}{3}$

f) $y = x^2$

$x = y^2$

$y = \pm\sqrt{x}$

$\frac{1}{2} \div 6 = \frac{1}{2} \cdot \frac{1}{6}$

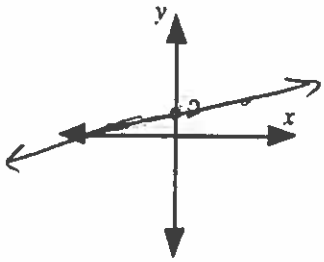
7. Graph the inverse of the following functions using a graphing calculator.

a) $y = 4x - 8$

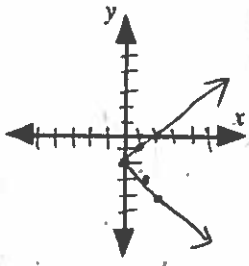
$x = 4y - 8$

$\frac{x}{4} + \frac{8}{4} = \frac{4y}{4}$

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



b) $y = |x + 2|$



x	y
-4	2
-3	1
-2	0
-1	1
0	2

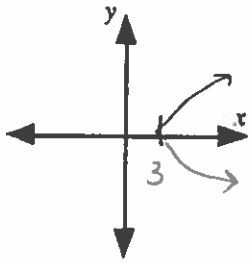
inverse: (2,-4) (0,-2) (2,0) (1,-3) (1,-1)

c) $y = x^2 + 3$

$x = y^2 + 3$

$\pm\sqrt{x - 3} = y^2$

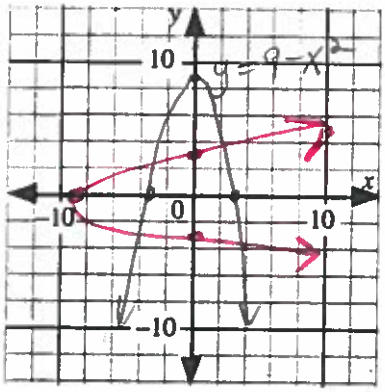
$y = \pm\sqrt{x-3}$



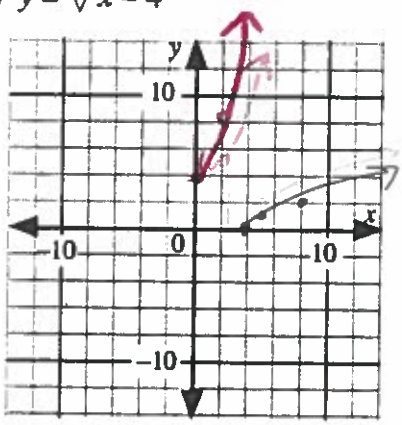
8. In each case graph the function defined by the equation and the inverse of the function on the grid provided.

a) $y = 9 - x^2$

$x = 9 - y^2$



b) $y = \sqrt{x - 4}$



x	y
4	0
5	1
8	2

Multiple Choice

9. When a function and its inverse are graphed on the same grid, which of the following lin must be a line of symmetry for the graph?

A. the x-axis **B.** the y-axis **C.** the line $y = x$ **D.** the line $y = -x$

10. A function is defined by the equation $y = 2x^2 - 3$. The inverse of the function has equation

A. $y = \frac{x + 3}{2}$

B. $y = 3 - 2x^2$

C. $y = \pm\sqrt{\frac{x + 3}{2}}$

D. $y = \pm\sqrt{\frac{2}{x + 3}}$

$x = 2y^2 - 3$

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

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

$y = \pm\sqrt{\frac{x+3}{2}}$

11. The point $(a, 2)$ lies on the graph of a function and on the graph of the inverse of the function. The value of a is

A. 2 **B.** 0 **C.** −2

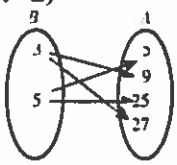
D. impossible to determine without further information.

→ if it lies on both graphs than swapping them does not change point so $a = 2$

$(2,2) \rightarrow$ swapped is still $(2,2)$

Answer Key

1. a)



b) no

2.

FUNCTION	INVERSE	Is the inverse a function?
divide by 3	multiply by 3	yes
cube	cube root	yes
add 10, then multiply by 2	divide by 2, then subtract 10	yes
square, then subtract 5	add 5, then square root	no

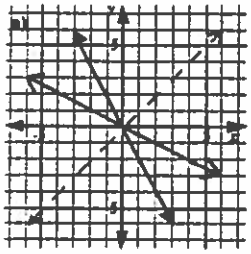
3. a) $\{(9, -2), (7, -1), (5, 0), (3, 1), (1, 2)\}$

b) yes because each element of the first set (x-coordinates) is mapped to one and only one element of the second set (y-coordinates).

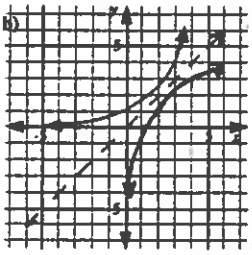
4. a) $\{(1, -2), (-2, -1), (-3, 0), (-2, 1), (1, 2)\}$

b) no because the elements −2 and 1 in the first set both map to more than one element of the second se

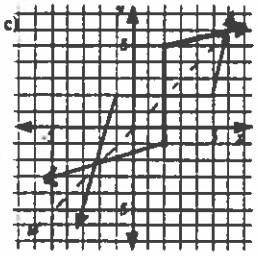
5. a) The inverse is a function.



b) The inverse is a function.



c) The inverse is not a function.



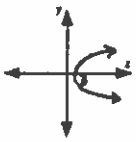
6. a) $y = 3x + 6$ **b)** $y = -\frac{1}{8}x + \frac{3}{4}$ **c)** $y = 5x + 2$

d) $y = 3x + 7$ **e)** $y = \frac{1}{12}x - \frac{2}{3}$ **f)** $y = \pm\sqrt{x}$

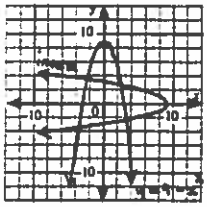
7. a)

b)

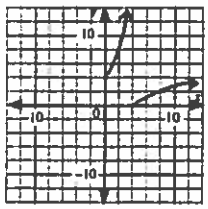
c)



8. a)



b)



9. C **10.** C **11.** A