

Adv. Alg. - Function Operations, Compositions, & Inverses  
REVIEW ASSIGNMENT

Name Ky

Perform each function operation. Then find the domain.

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

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

1.  $g(x) - f(x)$

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

$$x^2 - 3x + 2 - x + 2$$

$$x^2 - 4x + 4$$

$$(g-f)(x) = x^2 - 4x + 4$$

$$\text{Domain: } \mathbb{R}$$

2.  $-2g(x) + f(x)$

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

$$-2x^2 + 6x - 4 + x - 2$$

$$-2x^2 + 7x - 6$$

$$-2g + f = -2x^2 + 7x - 6$$

$$\text{Domain: } \mathbb{R}$$

3.  $\frac{f(x)}{g(x)}$

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

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

$$\text{Domain: } x \neq 2, 1$$

4.  $f(x) \cdot g(x)$

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

$$x^3 - 3x^2 + 2x$$

$$-2x^2 + 6x - 4$$

$$(f \cdot g)(x) = x^3 - 5x^2 + 8x - 4$$

$$\text{Domain: } \mathbb{R}$$

Let  $f(x) = x^2$  and  $g(x) = x - 3$ . Evaluate each expression.

5.  $(g \circ f)(-2)$

$$f(-2) = (-2)^2$$

$$= 4$$

$$g(4) = 4 - 3$$

$$= 1$$

$$(g \circ f)(-2) = 1$$

6.  $(f \circ g)(-2)$

$$g(-2) = -2 - 3$$

$$= -5$$

$$f(-5) = (-5)^2$$

$$= 25$$

$$(f \circ g)(-2) = 25$$

7.  $f(g(0))$

$$g(0) = 0 - 3$$

$$= -3$$

$$f(-3) = (-3)^2$$

$$= 9$$

$$f(g(0)) = 9$$

8.  $g(g^{-1}(7))$

$$g(g^{-1}(7)) = 7$$

9.  $(f \circ g)(c)$

$$g(c) = c - 3$$

$$f(c-3) = (c-3)^2$$

$$= (c-3)(c-3)$$

$$= c^2 - 3c - 3c + 9$$

$$(f \circ g)(c) = c^2 - 6c + 9$$

10. A store is offering a 15% discount on all items. You have a coupon worth \$2.00 off any item. Let  $x$  be the original cost of any item.

a. Write an equation,  $f(x)$ , to represent the cost after the 15% discount.  $f(x) = x - .15x$   $f(x) = .85x$

b. Write an equation,  $g(x)$ , to represent the cost after the \$2.00 coupon.  $g(x) = x - 2$

c. Explain the meaning of  $f(g(x))$ . Evaluate  $f(g(10))$ .

→ Take \$2 off 1st,

then apply the

15% off 2nd.

$$g(10) = 10 - 2 = 8$$

$$f(8) = .85(8) = 6.8$$

$$f(g(10)) = \$6.80$$

d. Explain the meaning of  $g(f(x))$ . Evaluate  $g(f(10))$ .

→ Apply the 15% discount 1st, then

take \$2 off 2nd.

$$f(10) = .85(10) = 8.5$$

$$g(8.5) = 8.5 - 2 = 6.5$$

$$g(f(10)) = \$6.50$$

Find the inverse of each function. Graph the function and its inverse. Determine if  $f(x)$  and  $f^{-1}(x)$  are functions. Determine the domains and ranges of  $f(x)$  and  $f^{-1}(x)$ .

11.  $f(x) = (x+4)^2 - 2$

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

$$x+2 = (y+4)^2$$

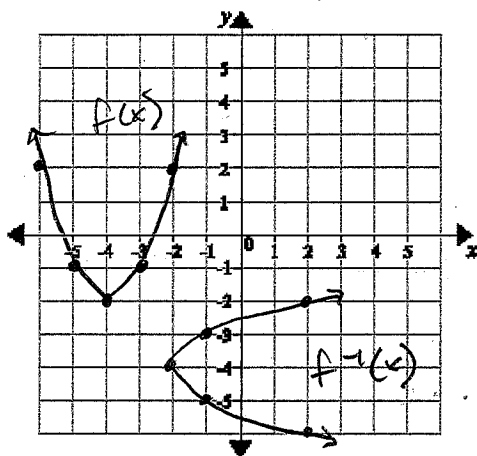
$$\pm \sqrt{x+2} = y+4$$

$$\pm \sqrt{x+2} - 4 = y$$

$$f^{-1}(x) = \pm \sqrt{x+2} - 4$$

$x$	$y$
-6	2
-5	-1
-4	-2
-3	-1
-2	2

$x$	$y$
2	-6
-1	-5
-2	-4
-1	-3
2	-2



Is  $f(x)$  a function: yes or no (circle one)

Is  $f(x)^{-1}$  a function: yes or no (circle one)

$f(x)$ : domain:  $\mathbb{R}$  range:  $y \geq -2$

$f^{-1}(x)$ : domain:  $x \geq -2$  range:  $\mathbb{R}$

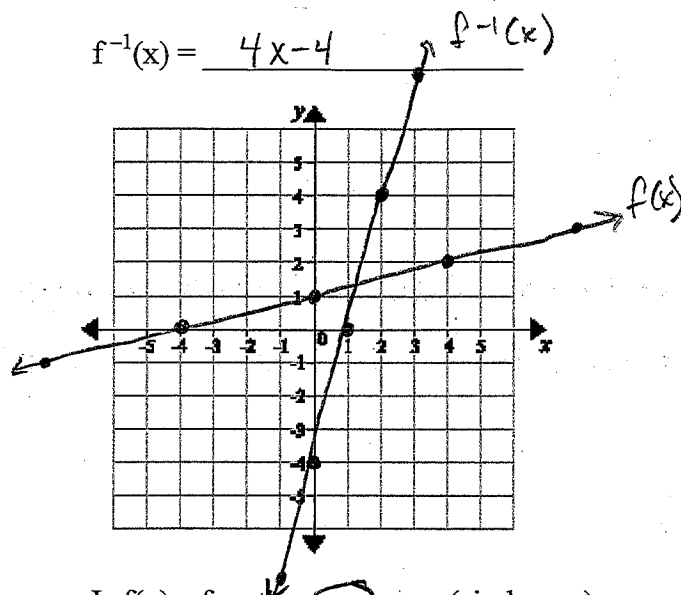
12.  $f(x) = \frac{1}{4}x + 1$

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

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

$$4x-4 = y$$

$$f^{-1}(x) = 4x-4$$



Is  $f(x)$  a function: yes or no (circle one)

Is  $f(x)^{-1}$  a function: yes or no (circle one)

$f(x)$ : domain:  $\mathbb{R}$  range:  $\mathbb{R}$

$f^{-1}(x)$ : domain:  $\mathbb{R}$  range:  $\mathbb{R}$