

- Composition of Functions
  - Finding Inverse Functions Algebraically
  - Finding Inverse Functions Graphically (reflecting over  $y = x$ )
  - One-to-One Functions (horizontal line test)
  - Laws of Exponents (zero and negative exponents)
  - Fractional Exponents
  - Solving Exponential Equations
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*Practice:*

1. If  $R = \{(-2,3), (a,4), (1,9), (0,7)\}$ , which replacement for  $a$  makes this relation a function?

- (1) 1 (3) 0  
(2) -2 (4) 4

2. If  $f(x) = x - 10$  and  $g(x) = 10 - 2x$  and  $f(x) = g(x) + 10$ , then  $x$  is

- (1) 1 (3) -1  
(2) 10 (4) -10

3. If  $h(x) = -2x^2 + x - 3$ , find each of the following in simplest form:

- a)  $h(-x)$ .  
b)  $h(x+2)$ .

4. If  $f(x) = x^2 - 2x$ ,  $g(x) = 3 - 8x$ , and  $h(x) = 4x - 1$ , find each of the following in simplest form.

- a)  $(f \circ h)(x)$       b)  $(h \circ g)(x)$       c)  $(g \circ g)(x)$       d)  $(g \circ f)(x)$

5. If  $g(x) = \frac{1}{x-2}$ , where  $x \neq 2$ , what is  $g^{-1}\left(\frac{1}{2}\right)$ ?

6. If  $f(x) = \frac{3}{x^2-1}$  and  $g(x) = \frac{1}{x+1}$ , then find each of the following in simplest form.

- a)  $(f \circ g)(x)$       b)  $(g \circ f)(x)$       c)  $(g \circ g)(x)$

7. Evaluate:

- a)  $\left(\frac{2}{3}\right)^{-3}$       b)  $(-27)^{-\frac{4}{3}}$       c)  $\left(\frac{1}{125}\right)^{-\frac{1}{3}}$

8. Simplify and express with positive exponents only:

$$\frac{(a^3b^{-2})^2}{a^{-3}b^3}$$

9. Solve for  $x$ :

$$\left(\frac{1}{2}\right)^{x-4} = 16^{5x}$$

10. Find  $f^{-1}(x)$  if  $f(x) = -5x + 2$ .

11. Which of the following is a one-to-one function?

- (1)  $y = x^2$                       (3)  $y = x$   
(2)  $x = y^2$                       (4)  $y = |x|$

12. Find the inverse of the function  $f(x) = \frac{2}{3}x + 1$  and sketch both  $f$  and  $f^{-1}$  on the accompanying grid. State the coordinates of a point on the inverse function.

