

# Algebra 3 Review Worksheet

Find  $f \circ g$  and  $g \circ f$  if

1.  $f(x) = 3x - 1$ ,  $g(x) = \frac{1}{x^2 + 1}$

2.  $f(x) = \sqrt[3]{1-x}$ ,  $g(x) = 1 - x^3$

3. If the function  $f(x) = \frac{2x+1}{x+2}$  and  $f(g(x)) = \frac{6x-1}{3x+1}$ , find  $g(x)$ .

Find  $f^{-1}(x)$  for the following.

4.  $f(x) = \sqrt[3]{2x+5} - 4$

5.  $f(x) = \frac{2x+1}{x+2}$

6.  $f(x) = -\sqrt{5x+1}$

B. Solve for  $x$ :

1.  $9^{2-x} = 27^{2x+1}$

2.  $8^{2x-5} = (\sqrt{2})^{x+1}$

3.  $4 \cdot 8^{2x} = \left(\frac{1}{16}\right)^{1-x}$

4.  $\log_8 \sqrt[3]{4} = x$

5.  $\log_{\frac{1}{4}} x = -\frac{1}{2}$

6.  $\log_x 2 = -\frac{1}{2}$

7.  $\log_x (0.125) = 3$

8.  $\log_3 (\log_8 x) = -1$

9.  $9^{\log_9 4} = x$

10.  $3^{\log_9 4} - 9^{\log_3 4} = x$

11.  $3(\log_8 x)^2 - 2\log_8 x - 1 = 0$

12.  $\log_5 (2x+3) = \log_5 (1-x)$

13.  $\log (1-x) + \log (1-2x) = \log_3 3$

14.  $\log_2 (x-3) - \log_2 (x+1) = \log_2 8$

15.  $\log_4 (2x+3) = \log_2 x$

16.  $4^{\log_4 2} + 4^{\log_2 \sqrt{6}} = 8^{\log_4 x}$

17.  $\log_7 (x+1) + \log_7 x + \log_7 (2x+1) = \log_7 30$

C. Isolate  $x$  completely.

1.  $3^x = 8$

2.  $2^{3x-2} = 5^{1-x}$

3.  $5^{2x+3} = 3^{x+1}$

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## ANSWERS

$$1. f \circ g = \frac{2-x^2}{x^2+1}$$

$$g \circ f = \frac{1}{9x^2-6x+2}$$

$$2. f \circ g = g \circ f = x$$

$$3. g(x) = 3x - 1$$

$$4. f^{-1}(x) = \frac{x^3 + 12x^2 + 48x + 59}{2}$$

$$5. y = \frac{1-2x}{x-2}$$

$$6. f^{-1}(x) = \frac{x^2-1}{5}$$

$$B. 1. x = \frac{1}{8}$$

$$2. x = \frac{31}{11}$$

$$3. x = -3$$

$$4. x = \frac{2}{9}$$

$$5. x = 2$$

$$6. x = \frac{1}{4}$$

$$7. x = \frac{1}{2}$$

$$8. x = 2$$

$$9. x = 4$$

$$10. x = -14$$

$$11. x = \frac{1}{2}, 8$$

$$12. x = -\frac{2}{3}$$

$$13. x = -\frac{3}{2}$$

$$14. \text{No solution}$$

$$15. x = 3$$

$$16. x = 4$$

$$17. x = 2 \text{ (the other 3 are imaginary)}$$

$$C1. \frac{\log 8}{\log 3} = 1.893$$

$$2. \frac{\log 20}{\log 40} = .812$$

$$3. \frac{\log \frac{3}{125}}{\log \frac{25}{3}} = -1.759$$