

## Algebra 3 Assignment # 4 – Review Worksheet

(1) Find each of the following numbers, given the functions below.

$$f(x) = x^2 - 2x \quad ; \quad g(x) = 3x \quad ; \quad h(x) = \sqrt{x + 1}$$

(a)  $f(h(3))$

(b)  $g(h(0))$

(c)  $f(h(g(8)))$

(d)  $g(f(h(8)))$

(2) Find the domain of each of the following functions please.

(a)  $f(x) = \sqrt{24x^2 - 29x - 4}$

(b)  $f(x) = \frac{\sqrt{x - 1}}{x^2 - 9}$

(c)  $f(x) = \frac{5x + 2}{x^3 - 4x^2 + x + 6}$

(d)  $f(x) = \sqrt{\frac{(x + 3)(x - 1)^2}{(x - 5)}}$

(3) Find  $f(g(x))$  and  $g(f(x))$  for each of the following.

(a)  $f(x) = 2x + 1$   
 $g(x) = x^2 - 3$

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

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

(a)  $f(x) = 5x - 7$

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

(c)  $f(x) = \frac{3x + 2}{2x - 5}$

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

(5) Find all values of  $x$  for which  $f(g(x)) = g(f(x))$  if  $f(x) = x - 5$  and  $g(x) = 2x^2 - 4x + 3$ .

(6) Find  $g(x)$ , if  $f(x) = \frac{2x + 1}{x + 2}$  and  $f(g(x)) = \frac{6x - 1}{3x + 1}$ .

(7) Let  $f(x) = 5x - 7$ . Find all values of  $\varphi$  such that  $3f(2\varphi) = 10$ .

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## Answers

(1) (a) 0

(b) 3

(c) 15

(d) 9

(2) (a)  $x \leq -\frac{1}{8}$  or  $x \geq \frac{4}{3}$

(b)  $x \geq 1$  and  $x \neq 3$

(c)  $x \neq -1, 2, 3$

(d)  $x \leq -3$  or  $x = 1$  or  $x > 5$

(3) (a)  $f(g(x)) = 2x^2 - 5$  ,  $g(f(x)) = 4x^2 + 4x - 2$

(b)  $f(g(x)) = \frac{8x - 1}{-x + 5}$  ,  $g(f(x)) = \frac{5x + 1}{x + 8}$

(4) (a)  $f^{-1}(x) = \frac{x+7}{5}$

(b)  $f^{-1}(x) = \frac{(x+4)^3 - 5}{2}$

(c)  $f^{-1}(x) = \frac{5x+2}{2x-3}$

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

(5)  $\frac{15}{4}$

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

(7)  $\frac{31}{30}$