

# Math 151 - Quiz 5

March 9, 2016

Name key

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Use compositions to show that  $f(x) = \sqrt[5]{x+3}$  and  $g(x) = x^5 - 3$  are inverses.

$$\begin{aligned} f(g(x)) &= \sqrt[5]{(x^5 - 3) + 3} \\ &= \sqrt[5]{x^5} \\ &= x \text{ For All } \\ &\quad x \text{ in } \mathbb{R} \end{aligned}$$

$$\begin{aligned} g(f(x)) &= (\sqrt[5]{x+3})^5 - 3 \\ &= (x+3) - 3 \\ &= x \text{ For All } x \text{ in } \mathbb{R} \end{aligned}$$

2. (2 points) Some values of the function  $f$  are given in the table below. Assuming that  $f$  has an inverse function, use the data in the table to determine  $f^{-1}(3)$  and  $f^{-1}(5)$ .

$x$	1	3	5	7	9
$f(x)$	-1	5	-8	3	6

$$f^{-1}(3) = 7$$

$$f^{-1}(5) = 3$$

3. (3 points) Find the inverse of the function  $g(x) = 4(x - 7)$ .

DOMAIN OF  $g$  IS  $\mathbb{R}$   
 $g$  IS 1-1.  
 IT IS A LINEAR  
 FUNCTION

$$\begin{aligned} y &= 4(x-7) \\ \frac{y}{4} &= x-7 \end{aligned}$$

$$\begin{aligned} \frac{y}{4} + 7 &= x \\ y &= \frac{x}{4} + 7 \end{aligned}$$

$$\begin{aligned} g^{-1}(x) &= \frac{x}{4} + 7 \\ \text{Domain: } &\mathbb{R} \end{aligned}$$

4. (2 points) If  $f(x) = \sqrt{x+4} - 5$ , what is the domain of  $f^{-1}(x)$ .

DOMAIN OF  $f^{-1}$  IS RANGE OF  $f = [-5, \infty)$

