

## Quiz 8

Name: Key

Math 115, Fall 2016

Thursday Discussion Time: \_\_\_\_\_

**Directions:** You have 20 minutes to complete this quiz. Read each problem carefully. There are three problems on the back of this page. Please put a box around your answers. No calculators are allowed.

1. (2 points)

Let  $f(x) = x^3 - 4$ . Parts (a) and (b) below refer to this function.(a) Find  $f^{-1}(x)$ .  $y = x^3 - 4 \Rightarrow x = y^3 - 4 \Rightarrow y^3 = x + 4 \Rightarrow y = \sqrt[3]{x+4}$ 

$$\boxed{f^{-1}(x) = \sqrt[3]{x+4}}$$

(b) Check your answer to part (a) by showing

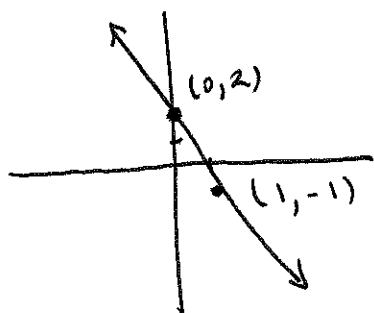
$$f(f^{-1}(x)) = x.$$

$$f(f^{-1}(x)) = f(\sqrt[3]{x+4}) = (\sqrt[3]{x+4})^3 - 4 = (x+4) - 4 = x.$$

2. (2 points)

Let  $g(x) = -3x + 2$ . Parts (a) and (b) below refer to this function.(a) Show algebraically that  $g$  is one-to-one.

$$g(a) = g(b) \Rightarrow -3a + 2 = -3b + 2 \Rightarrow -3a = -3b \\ \Rightarrow a = b.$$

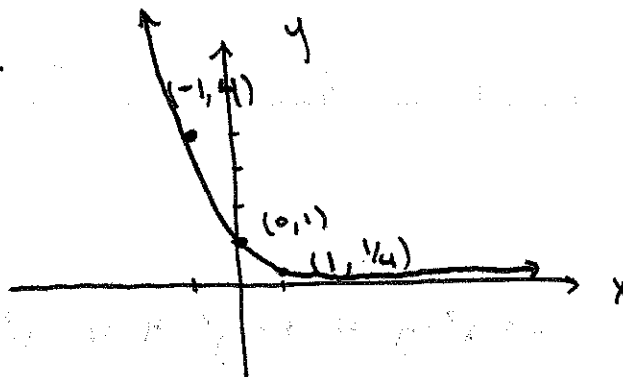
(b) Show graphically that  $g$  is one-to-one. What test are you applying?

The graph passes the  
Horizontal Line Test,  
so the function  $g$  is one-to-one.

3. (2 points)

Let  $h(x) = \left(\frac{1}{4}\right)^x$ . Sketch the graph of  $h$ , and label three points on the graph.

$x$	-1	0	1
$\left(\frac{1}{4}\right)^x$	4	1	$\frac{1}{4}$



4. (2 points)

Evaluate each of the following.

(a)  $\log(10000) = 4$

(b)  $\ln\left(\frac{1}{e}\right) = -1$

(c)  $\log_2(\sqrt{2}) = \frac{1}{2}$

(d)  $\log_7(49) = 2$

5. (2 points)

Solve the equation  $\log_6 x = -2$ .

$$x = 6^{-2}$$

$$x = \frac{1}{6^2}$$

$$\boxed{x = \frac{1}{36}}$$