Math 10A with Professor Stankova
Quiz 2; Wednesday, 9/6/2017
Section #107; Time: 11 AM
GSI name: Roy Zhao **Name:** _____

Circle True or False or leave blank. (1 point for correct answer, -1 for incorrect answer, 0 if left blank)

1. True **FALSE** If $f(x) = \sqrt{x}$, then the domain of $f^{-1}(x)$ is all real numbers.
2. True **FALSE** If f, g are functions such that $\lim_{x\to 0} f(x) = L$ and g is continuous at $x = L$, then we must have $\lim_{x\to 0} g(f(x)) = g(f(0))$.

Show your work and justify your answers.

3. (10 points) Let $f(t) = \dfrac{\sqrt{t+3}-3}{t-6}$.

   (a) (2 points) What is the domain of f?

   Solution: The domain is when $t + 3 \geq 0$ and $t \neq 6$. So the domain is $D = [-3, \infty) \cap \{t : t \neq 6\} = [-3, 6) \cup (6, \infty) = \{t : t \geq -3 \text{ and } t \neq 6\}$.

   (b) (3 points) Find $\lim_{t\to 1} f(t)$.

   Solution: Since f is continuous at $t = 1$, which we know since it is a combination of polynomials, the limit is just $f(1) = \dfrac{\sqrt{1+3}-3}{1-6} = \dfrac{\sqrt{4}-3}{-5} = \dfrac{1}{5}$.

   (c) (5 points) Find $\lim_{t\to 6} f(t)$.

   Solution: We have that

$$\lim_{t\to 6} \frac{\sqrt{t+3}-3}{t-6} = \lim_{t\to 6} \frac{\sqrt{t+3}-3}{t-6} \cdot \frac{\sqrt{t+3}+3}{\sqrt{t+3}+3}$$

$$= \lim_{t\to 6} \frac{t+3-9}{(t-6)(\sqrt{t+3}+3)} = \lim_{t\to 6} \frac{1}{\sqrt{t+3}+3} = \frac{1}{\sqrt{9}+3} = \frac{1}{6}.$$