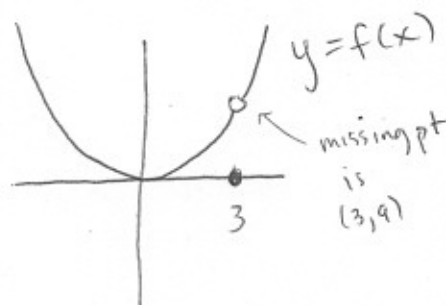


NAME: SOLUTIONS

Math 105 - Quiz 6 - October 3, 2007

Instructions: Show all of your work and circle your final answers. Calculators are allowed, but notes and books are not.

1. (12 pts.) For problems (a) through (d), let $f(x) = \begin{cases} x^2 & \text{if } x \neq 3 \\ 0 & \text{if } x = 3 \end{cases}$



(a) Evaluate $\lim_{x \rightarrow 2} f(x)$.

As $x \rightarrow 2$, $f(x)$ is the function x^2 ,

so $f(x)$ approaches $2^2 = 4$.

(b) Evaluate $\lim_{x \rightarrow 3} f(x)$.

$$\boxed{\text{So, } \lim_{x \rightarrow 3} f(x) = 4.}$$

As $x \rightarrow 3$ (with $x \neq 3$), $f(x)$ is the function x^2 ,

so $f(x)$ approaches $3^2 = 9$.

$$\boxed{\lim_{x \rightarrow 3} f(x) = 9.}$$

(c) Evaluate $f(3)$.

$$\boxed{f(3) = 0.}$$

(d) Is $f(x)$ continuous at $x = 3$? Explain.

$\lim_{x \rightarrow 3} f(x) \neq f(3)$, so $f(x)$ is not continuous at $x = 3$.

2. (8 pts.) Find an antiderivative of $g(x) = 5x^2 + 3\sqrt{x} + \frac{1}{x^4} + 3$. $= 5x^2 + 3x^{1/2} + x^{-4} + 3$

$$G(x) = 5 \cdot \left(\frac{1}{3}x^3\right) + 3\left(\frac{2}{3}x^{3/2}\right) + \left(\frac{1}{-3}x^{-3}\right) + 3x + C$$

$$G(x) = \frac{5}{3}x^3 + 2x^{3/2} - \frac{1}{3}x^{-3} + 3x + C, \text{ for any constant } C.$$