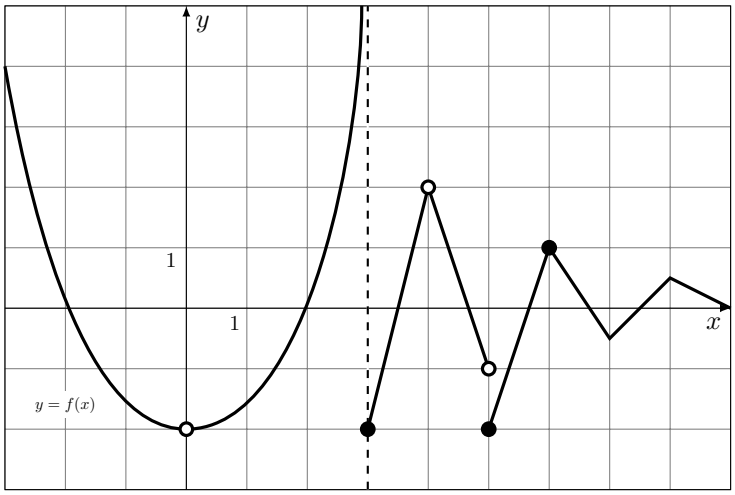
Math 133 - Quiz 2

Name: _____

1. List all the discontinuity points of $f(x)$ and using the 3 parts of the definition of continuity list the reason why each of them is a discontinuity point, include **ALL** that apply:



a) $f(c)$ is not defined.

b) $\lim_{x \to c} f(x)$ does not exist.

c) $\lim_{x \to c} f(x) \neq f(c)$.

Points	**Reasons**

2. Find a number k such that $f(x)$ becomes continuous on $(-\infty, \infty)$. Show that your proposed k actually makes the function f continuous.

$$f(x) = \begin{cases} 7x - 2, & x \leq 1 \\ kx^2, & x > 1 \end{cases}$$

3. Show that $f(x) = x - cos(x)$ has at least one root in the interval $[0, \frac{\pi}{2}]$.

4. We know $\lim_{x \to 0} \frac{\sin x}{x} = 1$. Find $\lim_{x \to 0} \frac{3x}{\sin 5x}$. Show all the steps.

5. We know $-|x| \leq x \cos \frac{1}{x} \leq |x|$ for all x. Find $\lim_{x \to 0} x \cos \frac{1}{x}$. Explain your reasoning.