

Names: _____

Activity #2: Continuity

Calculus I

1. Compute the following limit.

$$\lim_{x \rightarrow 0} |2x^2 + x - 3|$$

2. Compute the following limit.

$$\lim_{x \rightarrow 2} \left| \frac{x^3 - 8}{x - 2} \right|$$

3. Compute the limit of the difference quotient

$$\lim_{x \rightarrow t} \frac{f(x) - f(t)}{x - t}$$

when $f(x) = 9x + 5$ and $t = 6$.

4. Compute the limit of the difference quotient

$$\lim_{x \rightarrow t} \frac{f(x) - f(t)}{x - t}$$

when $f(x) = 8x^2 + 6x + 9$ and $t = 10$.

5. Compute the limit of the difference quotient

$$\lim_{x \rightarrow t} \frac{f(x) - f(t)}{x - t}$$

when $f(x) = \sqrt{x + 3}$ and $t = 3$.

6. Compute the following limit.

$$\lim_{x \rightarrow 0} \frac{\sin(7x)}{x}$$

7. Compute the following limit.

$$\lim_{x \rightarrow 0} \frac{4x^2 + 6x + \sin x}{x}$$

8. Let $f(x)$ be the function

$$f(x) = \begin{cases} \frac{x-b}{b+2} & \text{if } x < 0 \\ x^2 + b & \text{if } x \geq 0. \end{cases}$$

Find the value(s) of the constant b such that $f(x)$ is continuous everywhere.