

Calculus I

Name: _____

Study Guide 6

Class: _____

Due Date: _____

Score: _____

No Work \Leftrightarrow No Points

Use Pencil Only \Leftrightarrow Be Neat & Organized

1. (3 points) Evaluate: $\lim_{x \rightarrow \infty} \frac{x^2 + x - 2}{x^2 - x}$

1. _____

2. (3 points) Evaluate: $\lim_{x \rightarrow \infty} \frac{x + 10}{\sqrt{25x^2 + 1}}$

2. _____

3. (4 points) Evaluate: $\lim_{x \rightarrow -\infty} \frac{3x - 2}{\sqrt{9x^2 - x}}$

3. _____

4. (3 points) Find a value for the constant k that will make the following function continuous.

$$f(x) = \begin{cases} kx^2, & x \leq 2 \\ kx + 8, & x > 2 \end{cases}$$

4. _____

5. (4 points) Evaluate: $\lim_{x \rightarrow a} \frac{x^2 + ax - 2a^2}{x^3 - a^3}$, express any restriction for your final answer.

5. _____

6. (4 points) Evaluate: $\lim_{x \rightarrow -1} \frac{1 - \cos(x^2 - 1)}{x^2 - 1}$

6. _____

7. (4 points) Evaluate $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ for $f(x) = \sin x$.

7. _____

8. (4 points) Evaluate $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ for $f(x) = \cos x$.

8. _____

9. (3 points) Show that the equation $x^3 + x^2 - 2x = 1$ has at least one solution on the interval $[-1, 1]$.

9. _____

10. Given $\lim_{x \rightarrow a} f(x) = b$, find $\lim_{x \rightarrow a} f(-x)$

(a) (2 points) if $f(x)$ is an even function.

(a) _____

(b) (2 points) if $f(x)$ is an odd function.

(b) _____

11. (4 points) Show that the equation $2 \sin x + 1 = x$ has at least one solution on the interval $[-1, 3]$.

11. _____

12. (5 points) Evaluate $\lim_{x \rightarrow \infty} \frac{\sqrt{4x+1} + \sqrt{4x-1}}{x}$.

12. _____

13. (5 points) Evaluate $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 4x} - x)$.

13. _____