

Name: _____ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. [12 points] Evaluate the following limits. If a value does not exist, write DNE. You must show work to receive full credit.

a. $\lim_{x \rightarrow 3} \frac{2x^2 - 6x}{x^2 + x - 12}$

b. $\lim_{x \rightarrow 0} \frac{x^3 - 4x}{(1 + \sin x) \cos x}$

c. $\lim_{x \rightarrow 2} \frac{\sqrt{7+x} - 3}{x - 2}$

2. [4 points] Given $\lim_{x \rightarrow 10} f(x) = 2$ and $\lim_{x \rightarrow 10} g(x) = -5$, evaluate $\lim_{x \rightarrow 10} 2 \left(\frac{x+1}{f(x)+g(x)} \right)$ using limit laws.

3. [5 points] Let $f(x) = \begin{cases} (x-1)^2 & x < 0 \\ e^x & x \geq 0 \end{cases}$.

a. Find $\lim_{x \rightarrow 0^-} f(x)$.

b. Find $\lim_{x \rightarrow 0^+} f(x)$.

c. What is $f(0)$?

d. Use your answers to parts (a), (b) and (c) to justify whether $f(x)$ is or is not continuous at $x = 0$. (Your answer should be a complete sentence.)

4. [4 points] Use the Intermediate Value Theorem to show that $f(x) = \sin(2x) - \cos(3x) = 0$ for some x -value on the interval $(0, \pi)$.