

Name: _____

EMPLID: _____

1. (5 points) Evaluate $\lim_{x \rightarrow 1^+} \ln(\sqrt{x} - 1)$.

1. _____

2. (5 points) Evaluate $\lim_{x \rightarrow -3} \frac{x^2 + 3x}{x^2 - x - 12}$.

2. _____

3. (5 points) Evaluate $\lim_{x \rightarrow 0^-} \left(\frac{1}{x} - \frac{1}{|x|} \right)$.

3. _____

4. (5 points) Find the value of c so that

$$f(x) = \begin{cases} cx^2 + 2x & \text{if } x < 2 \\ x^3 - cx & \text{if } x \geq 2 \end{cases}$$

is continuous.

4. _____

5. (5 points) Evaluate $\lim_{t \rightarrow \infty} \frac{t+3}{\sqrt{2t^2-1}}$.

5. _____

6. (5 points) Use the definition of the derivative to find $f'(3)$ when $f(x) = \frac{x}{x+6}$.

7. (5 points) The limit $\lim_{h \rightarrow 0} \frac{\sqrt{9+h}-3}{h}$ represents the derivative of some function f at some number a . State f and a .

7. _____

8. (5 points) (True/False) If f is continuous at 5 and $f(4) = 10$ and $f(5) = 2$, then $\lim_{x \rightarrow 2} f(4x^2 - 11) = 2$.

8. _____

9. (5 points) Differentiate $h(t) = \frac{1}{\sqrt{t}} - 2e^t$.

9. _____

10. (5 points) Find the equation of the tangent line to $y = 2x^3 - x^2 + 2$ at $(1, 3)$.

10. _____

11. (5 points) Find and simplify $\frac{dy}{dt}$ when $y = \frac{5t}{t^3-t-1}$.

11. _____

12. (5 points) Find the equation of the tangent line to $y = x + 2xe^x$ at $(0, 0)$.

12. _____