

PreCalculus '13-'14
Limits and Derivatives Test v6
CALCULATOR ALLOWED

Name: _____

Score _____

Round to 3 decimal places. Show all work.

1. Evaluate the following limits:

a. $\lim_{x \rightarrow 1} \frac{x^2 + 2x - 3}{x^2 - 1} =$

b. $\lim_{x \rightarrow 3} \frac{x^2 - 9}{2x^2 - 7x + 3} =$

c. $\lim_{x \rightarrow -1} \frac{3x^2 + 2x - 1}{x^3 + x^2 + 4x + 4} =$

2. Use the equation of the line tangent to $y = 6x^3 - 3x^2 + 5x - 4$ at $x = 1$ to approximate $f(.9)$

3. The motion of a particle is described by $y(t) = 2t^3 + 5t^2 - 4t + 3$.
- a) When the particle is stopped?
 - b) Which direction it is moving at $t = 4$?
 - c) Where is it when $t = 4$?
 - d) Find $a(4)$.

4. At what point on the graph of $y = \frac{1}{3}x^3$ is the tangent parallel to the line $2x - 8y = 3$

5. Set up, but do not solve, the limit definition of the derivative for

$$\frac{d}{dx} [5x^4 - x^3 + 7x^2 + 3^4]$$

6. Find the following derivatives:

a. $\frac{dy}{dx}$ if $y = 6x^7 - 19x^4 + 3x^2 - 12x - 13$

b. $D_x \left[\sqrt[4]{x^7} - \frac{6}{x^5} - \sqrt[3]{x} + \pi^2 - x \right]$

c. $\frac{d}{dx} \left[x^7 - 4\sqrt[8]{x^7} + 7^3 - \frac{1}{\sqrt[7]{x^4}} + \frac{1}{5x} \right]$