PreCalculus '14-'15 Name:_____

Limits and Derivatives Test

CALCULATOR ALLOWED Score _____

Round to 3 decimal places. Show all work.

1. Evaluate the following limits:

a. $\lim_{x\to 6}\frac{x^2-36}{x^2-4x-12}=$

b. $\lim_{x\to -2}\frac{2x^2+x-6}{x^4+12x^2-64}$

c. $\lim_{x\to 4}\frac{2x^3-5x^2-17x+20}{x^3-4x^2-x+4}=$

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

3. The motion of a particle is described by $x(t) = 4t^3 - 63t^2 + 86t - 14$.

a) When the particle is stopped?
b) Which direction it is moving at $t = 4$?
c) Where is it when $t = 4$?
d) Where is it when $a(t) = 0$?

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

5. Set up, but do not solve, the limit definition of the derivative of $y = 12x^7 - 11x^4 + x^2 - 31x$

6. Find the following derivatives:

a. $\frac{dy}{dx}$ if $y = 6x^3 - x^2 + 8x + 42$

b. $D_x\left[16x^{15} - 18x^2 + 41x + e + 2 + \frac{3}{\sqrt{x^3}} + \frac{1}{x}\right]$

c. $D_x\left[\sqrt[3]{x^8} - \frac{6}{x^3} - \sqrt[7]{x} + \pi^3 + x\right]$