PreCalculus Accelerated Name:_____
Dr. Quattrin
Limits and Derivatives Test
CALCULATOR ALLOWED Score _____
Round to 3 decimal places. Show all work.

1. Use the equation of the line tangent to $y = x^3 - 2x^2 + 5x - 4$ at $x = 1$ to approximate $f(1.1)$

2. The motion of a particle is described by $x(t) = 2t^3 - 5t^2 - 56t + 8$.

a) When the particle is stopped?
b) Which direction it is moving at $t = 2$?
c) Where is it when $t = 2$?
d) Find $a(2)$.

3. Evaluate the following limits:

a) $\lim_{x\to 4} \frac{x^2-16}{x^2-x-12} =$

b) $\lim_{x\to 3} \frac{x^3-27}{4x^3-12x^2-x+3}$

c) $\lim_{x\to -5} \frac{x^3+5x^2-9x-45}{2x^3+11x^2-x-30} =$

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NO CALCULATOR ALLOWED

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

5. A particle's position at time t is described by $x(t) = t^3 - 4t^2 + 5t - 20$. When is the particle moving left? (Show the sign pattern of the velocity.)

6. Use the Power Rule to find:

a) Find $\frac{dy}{dx}$ if $y = 5x^3 - 3x^2 + 2x + 73$

b) Find $f'(x)$ if $f(x) = 13x^{12} - 2x^3 + 7x + 3 + \frac{1}{5x}$

c) $D_x\left[\sqrt[3]{x^5} - \frac{2}{\sqrt{x^3}} - \sqrt[5]{x} + \pi^2 + 2x\right]$