

Name: _____
AP Calc

Date: _____
Ms. Loughran

1982 AB 1

A particle moves along the X -axis in such a way that its acceleration at time t for $t > 0$ is given by $a(t) = \frac{3}{t^2}$.
When $t = 1$, the position of the particle is 6 and the velocity is 2.

- (a) Write an equation for the velocity, $v(t)$, of the particle for all $t > 0$.
- (b) Write an equation for the position, $x(t)$, of the particle for all $t > 0$.
- (c) Find the position of the particle when $t = e$.

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1998 AB 4

Let f be a function with $f(1) = 4$ such that for all points (x, y) on the graph of f the slope is given by $\frac{3x^2 + 1}{2y}$.

- (a) Find the slope of the graph of f at the point where $x = 1$.
- (b) Write an equation for the line tangent to the graph of f at $x = 1$ and use it to approximate $f(1.2)$.
- (c) Find $f(x)$ by solving the separable differential equation $\frac{dy}{dx} = \frac{3x^2 + 1}{2y}$ with the initial condition $f(1) = 4$.
- (d) Use your solution from part (c) to find $f(1.2)$.