

Snow Day Lesson #1

These are two free response questions from past AP tests. Answer each as completely as you can.

1. [1969 AB 2]

A particle moves along the x -axis in such a way that its position at time t is given by $x = 3t^4 - 16t^3 + 24t^2$ for $-5 \leq t \leq 5$.

- Determine the velocity and acceleration of the particle at time t .
- At what values of t is the particle at rest?
- At what values of t does the particle change direction?
- What is the velocity when the acceleration is first zero?

2. [1992 AB 4]

Consider the curve defined by the equation $y + \cos(y) = x + 1$ for $0 \leq y \leq 2\pi$.

- Find $\frac{dy}{dx}$ in terms of y .
- Write an equation for each vertical tangent to the curve.
- Find $\frac{d^2y}{dx^2}$ in terms of y .

3. [1987 AB 2]

Let $f(x) = \sqrt{1 - \sin x}$.

- What is the domain of f ?
- Find $f'(x)$.
- What is the domain of $f'(x)$?
- Write an equation for the line tangent to the graph of f at $x = 0$.