Name: _____

AP Calculus AB Intro to Linear Motion - Multiple Choice Practice

1) A particle moves along the x-axis so that its position at time t is given by $x(t) = 2t^2 - 12t + 9$. For what value of t is the particle at rest?

A) 1 B) 9 C) 3 D) 4 E) 0

2) A particle travels along the x-axis so that at any time $t \geq 0$, its position is given by $x(t) = t^3 - 9t^2 + 24t + 2$. For what value(s) of t is the velocity equal to zero?

A) $t = 3$, only B) $t = 0$ and $t = 3$ C) $t = 4$, only
D) $t = 2$, only E) $t = 2$ and $t = 4$

3) A particle moves along a horizontal axis so that its position is given by $x(t) = 4t^5 - 5t^3$ for any time t. How many times does the particle change direction?

A) 1 B) 2 C) 3 D) 0 E) 5

4) A particle moves on the x-axis such that its position at any time $t > 0$ is given by $x(t) = t^3 - 9t^2 + 24t$. What is the velocity of the particle when its acceleration is zero?

A) 24 B) 105 C) 3 D) 0 E) -3

5) A particle moves along a horizontal axis so that its position is defined by $S(t) = 4 \cos \frac{\pi}{2}t$ for $0 \leq t \leq 5$. What is the velocity of the particle at the time its acceleration is first equal to zero?

A) -4π B) 4π C) -2π D) $-\pi^2$ E) 2π

6) A particle moves along the x-axis in such a way that its position at any time t is given by $x(t) = t^4 - 8t^3 + 18t^2 + 2$ for $t > 0$. At what time is acceleration of the particle equal to 36?

A) 3 B) 4 C) 12 D) 2 E) 6

7) A particle moves along the x-axis so that at any time $t \geq 0$, its position is given by $x(t) = 2t + \sin(\pi t)$. What is the acceleration of the particle at time $t = \frac{3}{2}$?

A) 0 B) π C) 2 D) π^2 E) $-\pi^2$

8) If the position of a particle moving on the x-axis at any time t is given by $x(t) = 2t^3 - 3t^2$, what is the average acceleration of the particle for $0 \leq t \leq 3$?

A) 15 B) 9 C) 8 D) 12 E) 18

9) The position of a particle moving on a horizontal axis for time t, where $t \geq 0$, is $S(t) = 3 \sin \frac{1}{2}t + 1$. What is the average velocity of the particle for $0 \leq t \leq \frac{3\pi}{2}$?

A) $\frac{\pi}{\sqrt{2}}$ B) $\frac{\sqrt{2}}{\pi}$ C) $-\frac{\pi}{\sqrt{2}}$ D) $\frac{3\sqrt{2}}{\pi}$ E) $\frac{-\sqrt{2}}{\pi}$