

AP Calculus – Multiple Choice

Motion

Post Exam Set #3

No Calculator – You will have just under 2 minutes per question.

1.) A particle moves along the x -axis. The velocity of the particle at time t is $6t - t^2$. What is the total distance traveled by the particle from time $t = 0$ to $t = 3$?

[#6]

(A) 3	(B) 6	(C) 9	(D) 18	(E) 27
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2.) For $t \geq 0$, the position of a particle moving along the x -axis is given by $x(t) = \sin t - \cos t$. What is the acceleration of the particle at the point where the velocity is first equal to 0?

[#28]

a.) $-\sqrt{2}$	b.) -1	c.) 0	d.) 1	e.) $\sqrt{2}$
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3.) A particle moves along the x -axis with its position at time t given by $x(t) = t - a \sqrt{t} - b$, where a and b are constants and $a \neq b$. For which of the following values of t is the particle at rest?

[#16]

a.) $t = ab$	b.) $t = \frac{a+b}{2}$
c.) $t = a+b$	d.) $t = 2 \sqrt{a+b}$
e.) $t = a$ and $t = b$	

Calculator – You will have just under 3 minutes per question.

4.) A particle moves along the x -axis. The velocity of the particle at time t is given by $v(t)$, and the acceleration of the particle at time t is given by $a(t)$.

Which of the following gives the average velocity of the particle from time $t = 0$ to time $t = 8$?

[#79]

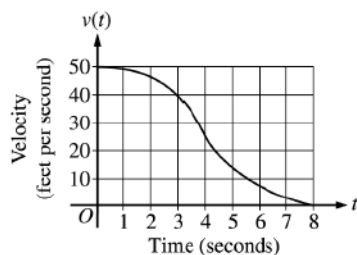
(A) $\frac{a(8) - a(0)}{8}$	(B) $\frac{1}{8} \int_0^8 v(t) dt$	(E) $\frac{v(8) + v(0)}{8}$
(C) $\frac{1}{8} \int_0^8 v(t) dt$	(D) $\frac{1}{2} \int_0^8 v(t) dt$	

5.) A particle moves along a line so that its acceleration for $t \geq 0$ is given by $a(t) = \frac{t+3}{\sqrt{t^3+1}}$. If the particle's

velocity at $t = 0$ is 5, what is the velocity of the particle at $t = 3$?

[#89]

(A) 0.713	(B) 1.134	(E) 11.710
(C) 6.134	(D) 6.710	



6.) The graph gives the velocity, v , in ft/sec, of a car for $0 \leq t \leq 8$, where t is the time in seconds. Of the following, which is the best estimate of the distance traveled by the car from $t = 0$ until the car comes to a complete stop?

[#83]

(A) 21 ft	(B) 26 ft	(C) 180 ft	(D) 210 ft	(E) 260 ft
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Practice Problems

1.) A particle moves along the x -axis so that at time $t \geq 0$ its position is given by

$$x(t) = 2t^3 - 21t^2 + 72t - 53. \text{ At what time } t \text{ is the particle at rest? (2003-25)}$$

- (A) $t = 1$ only (B) $t = 3$ only (C) $t = \frac{7}{2}$ only (D) $t = 3$ and $t = \frac{7}{2}$ (E) $t = 3$ and $t = 4$

2.) A particle moves along the x -axis so that at any time $t \geq 0$, its velocity is given by

$$v(t) = 3 + 4.1\cos(0.9t). \text{ What is the acceleration of the particle at time } t = 4?$$

(2003-76)

- (A) -2.016 (B) -0.677 (C) 1.633 (D) 1.814 (E) 2.978

3.) A particle moves along the x -axis so that at any time $t > 0$, its acceleration is given by $a(t) = \ln t + 2^t$. If the velocity of the particle is 2 at time $t = 1$, then the velocity of the particle at time $t = 2$ is

(2003-86)

- (A) 0.462 (B) 1.609 (C) 2.555
(D) 2.886 (E) 3.346

4.) The velocity, in ft/sec, of a particle moving along the x -axis is given by the function $v(t) = e^t + te^t$. What is the average velocity of the particle from time $t = 0$ to time $t = 3$?

(2003-83)

- (A) 20.086 ft/sec (B) 26.447 ft/sec
(C) 32.809 ft/sec (D) 40.671 ft/sec
(E) 79.342 ft/sec