HW75: Position, Velocity, Acceleration Worksheet

1. A particle moves along the x-axis so that at any time *t* its position is given by $x(t) = t^3 - 6t^2 + 9t + 11$. For what values of *t* is the particle at rest?

2. The position of a particle moving along the x-axis is $x(t) = \sin(3t) - \cos(2t)$ for $t \geq 0$. When $t = \frac{\pi}{2}$, the acceleration of the particle is?

3. The acceleration of a particle moving along the x-axis at time *t* is given by $a(t) = 6t - 18$. If the velocity is 24 when $t = 0$ and the position is 20 when $t = 1$, then $x(t) = ?$

4. A particle moves along a line so that at time *t* its position is given by $s(t) = -5\sin t - \frac{t^2}{2} + 10$. What is the velocity when the acceleration is zero?

5. A particle moves in a straight line with velocity $v(t) = 2t^2 + 1$. How far does the particle move between time $t=1$ and $t = 3$?

6. The acceleration of a body moving in a straight line is given by $a(t) = 6 - 8t$. If the velocity is 20 at $t = 2$, what is $s(4) - s(1)$?

7. A points moves in a straight line so that its distance $x(t) = 9t - 3t^2$. What is the total distance covered by the point between $t = 1$ and $t = 2$?

8. At $t = 0$ a particle starts at rest and moves along a line in such a way that at time *t*, $a(t) = 48t^2$ ft/sec^2. Through how many feet does the particle move during the first 3 seconds?

9. The acceleration of a particle moving along the x-axis at time $t > 0$ is $a(t) = 2t + 3$ ft/sec². If the velocity is 5 ft/sec at $t = 1$ sec and $x(0) = 1$, then $x(2)$ is?

10. A particle moves along the x-axis so that at any time $t \geq 0$ its position is given by $x(t) = (t-1)(t-3)^3$. For what values of t is the velocity increasing?

11. An object moves along the x-axis so that at any time $t > 0$ its position is given by $x(t) = t^4 + t^3 - 9t^2 + 16t$. At the instant when the acceleration becomes 0, the velocity is?

12. A point moves on the x-axis so that its distance from the origin at time t is given by $x(t) = 10t - 3t^2$. What is the total distance covered by the point between $t = 1$ and $t = 2$?

13. At $t = 0$, a particle starts at the origin with a velocity of 4 ft/sec and moves along the x-axis so that $a(t) = 24t^2$ ft/sec². Through how many feet does the particle move during the first 2 seconds?

14. The acceleration of a body moving along a straight line is given by $a(t) = 8 - 6t$. If the velocity is 10 at $t = 0$, what is $s(4) - s(1)$?

15. A particle moves along the x-axis with velocity given by $v(t) = t + 3\sin t$. If the particle is at the origin when $t = 0$, its position when $v(t) = 6$ is x = ??

PVA Worksheet Answers

1) t = 1, 3
2) 5
3) $x(t) = t^3 - 9t^2 + 24t + 4$
4) -5.100
5) 58/3
6) 33
7) 1.5
8) 324 ft.
9) 35/3
10) [0,2) U (3, infinity)
11) 5
12) 1.6666….
13) 40 ft.
14) 27
15) 19.304