

Integral Motion Problems

Directions: Do what it says.

1. A particle is moving with a constant acceleration of 2 feet per second per second. If the initial velocity of the particle was 3 feet per second and its initial position was 5, find the following:
 - a. $v(1)$
 - b. $s(2)$
2. If $v(t) = \frac{1}{t} + 2t$ and $s(1) = 3$, find $s(e)$.
3. A particle accelerates according to the equation $a(t) = \sec^2 t$. The velocity of the particle at $t = \frac{\pi}{4}$ is 2. Find the velocity of the particle at $t = \frac{\pi}{6}$.
4. A particle's acceleration is given by the equation $a(t) = \sin t + \cos t$. If the particle's initial position is 2 and the position at $t = \frac{\pi}{2}$ is 3, find the position of the particle at $t = \frac{\pi}{6}$.
5. A particle moves such that its velocity is given by the equation $v(t) = 4t^3 - 8t + 1$. Find the following:
 - a. The displacement of the particle from $t = 0$ to $t = 1$.
 - b. The displacement of the particle from $t = 1$ to $t = 5$.
 - c. The total distance traveled by the particle from $t = 0$ to $t = 3$.
6. A particle's acceleration is given by equation $a(t) = 2t - 1$. The velocity of the particle at $t = 1$ is 5. The particle's initial position is 0.
 - a. Find the velocity function.
 - b. Find $v(2)$.
 - c. Find the position function.
 - d. Find the particle's displacement in the first three seconds of movement.
 - e. Find the total distance traveled by the particle during the first 5 seconds of movement.
 - f. Find the particle's position at $t = 4$.