

Name _____

MA2

① The displacement at time t of an object moving along a line is given by $s(t) = t^3 - 6t^2 + 9t + 5$.

- (a) Find the velocity of the object and discuss its motion between times $t = 0$ and $t = 4$.
- (b) Find the total distance traveled by the object between times $t = 0$ and $t = 4$.

② The distance of a particle from some fixed point is given by

$$s(t) = t^2 + 5t + 2.$$

where t is time measured in seconds. Find the average velocity of the particle from

- (a) 4 seconds to 6 seconds
- (b) 4 seconds to 5 seconds

③ An object is at $s = 100 + 24t - 2t^3$ feet on an s -axis at t minutes.

- a. Give its velocity as a function of t .
- b. When is its velocity positive?

④ Suppose a person standing at the top of a building 112 feet high throws a ball vertically upward with an initial velocity of 96 ft/sec.

- (a) Find the ball's height and velocity at time t .
- (b) When does the ball hit the ground and what is its impact velocity?
- (c) When is the velocity 0? What is the significance of this time?
- (d) How far does the ball travel during its flight?

In Problems 22 through 27, $s(t)$ is the displacement of an object moving along a line. In each case, for the specified time interval:

- (a) Find the velocity of the object and discuss its motion.
- (b) Find the total distance traveled by the object.

22. $s(t) = t^2 - 2t + 6$ for $0 \leq t \leq 2$

23. $s(t) = 3t^2 + 2t - 5$ for $0 \leq t \leq 1$

24. $s(t) = t^3 - 9t^2 + 15t + 25$ for $0 \leq t \leq 6$

25. $s(t) = t^4 - 4t^3 + 8t$ for $0 \leq t \leq 4$

26. $s(t) = 2t^4 + 3t^2 - 36t + 40$ for $0 \leq t \leq 3$

27. $s(t) = t^4 - 9t^3 + 15t + 25$ for $0 \leq t \leq 6$