Calculus

Name: *Date:*

3G-Exercises: Motion Along a Line

1. (NC) A particle moves according to $s = t^4 - 4t^3$, for $t \geq 0$, where s is in meters and t is in seconds.

   a. Find the average velocity during the first second.

   b. Find the instantaneous velocity at time $t = 1s$.

   c. What is the particle's speed at time $t = 2s$?

   d. Does the particle ever come to a stop? If so, when?

   e. When is the particle moving the fastest?

   f. Find the distance traveled by the particle during the first 5 seconds.

2. (NC) The position of an object moving along a straight line is given by $s = t^3 - 6t^2 + 12t - 8$, for $t \geq 0$ where s is in feet and t is in seconds.

    a. Find the interval during which the displacement is increasing.

    b. Find the interval during which the velocity is decreasing.

    c. What is the minimum value of the speed of the particle?

3. (C) A particle moves along a line according to $s = 2t^3 - 9t^2 + 12t - 4$, $t \geq 0$ where s is in meters and t is in seconds.

    a. At what values of t is the displacement increasing?

    b. At what values of t is the velocity increasing?

    c. What is the particle's speed when t=1.5s?

    d. What is the total distance traveled between t=0 and t=4?