GROUP WORK 1, SECTION 3.7

Follow That Particle!

For 4.95 seconds, a particle moves in a straight line according to the position function

$$f(t) = \left(t^3 + 1\right)(5 - t) - 5$$

where t is measured in seconds and f in feet.

Answer the following questions. You can visualize this motion and verify many of your answers using a graph. First attempt all the problems by hand, and then graph the position function to verify your answers.

1. What is the position of the particle at $t = 0$, $t = 1$, $t = 2$, $t = 4.95$?

2. Find the velocity of the particle at time t. What is the velocity of the particle at $t = 0$, $t = 1$, $t = 2$, $t = 4.95$?

3. When is the particle at rest? When is the particle moving forward?

4. Find the total distance traveled by the particle on the intervals $[0, 1]$ and $[1, 2]$. Which is larger and why?

5. Find the acceleration of the particle at time t.

6. When was the particle speeding up? Slowing down?