Sample Practice Problems for the Topic of Motion

Example 1 (numerical).

The data in the table below give selected values for the velocity, in meters/minute, of a particle moving along the x-axis. The velocity v is a differentiable function of time t.

Time t (min)	0	2	5	6	8	12
Velocity $v(t)$ (meters/min)	-3	2	3	5	7	5

1. At $t = 0$, is the particle moving to the right or to the left? Explain your answer.

2. Is there a time during the time interval $0 \le t \le 12$ minutes when the particle is at rest? Explain your answer.

3. Use data from the table to find an approximation for $v'(10)$ and explain the meaning of $v'(10)$ in terms of the motion of the particle. Show the computations that lead to your answer and indicate units of measure.

4. Let $a(t)$ denote the acceleration of the particle at time t. Is there guaranteed to be a time $t = c$ in the interval $0 \le t \le 12$ such that $a(c) = 0$? Justify your answer.

Example 2 (Numerical)

v(t) is differentiable

Motion Problem

Time(min)	0	2	4	7	9	10
velocity v(t) meters/min	5	6	8	3	-3	-5

1) Using the table state a value of t when the particle is moving to the left. Justify your choice.

2) Is there a time during the interval $0 \leq t \leq 10$ minutes when the particle is at rest? Explain.

3) Use the table to approximate v' (3), indicating appropriate units. What does v'(3) mean in terms of the motion of the particle?