Practice worksheet | Differentiation and applications

Rates and motion applications

Name: _____ Date: _____

6 questions | 18 marks

1. For $s(t) = 2t^2 - 5t + 1$ metres, with t in seconds, find velocity and acceleration. [2 marks]

2. For $s(t) = t^3 - 3t$ metres on $t \geq 0$ seconds, find the rest time and whether direction changes. [3 marks]

3. For $s(t) = t^3 - 6t^2 + 9t$ metres on $0 \leq t \leq 4$ seconds, find displacement and total distance. [4 marks]

4. For velocity $v(t) = t^2 - 4t + 3$ metres per second, with t in seconds, find the speed and its instantaneous rate of change at $t = 2$ seconds. [3 marks]

5. A cube has side length increasing at 0.2 cm/s. Find the volume rate when the side is 3 cm. [3 marks]

6. A cost model is $C(q) = 0.02q^2 + 5q + 100$ dollars. Find and interpret marginal cost at 50 units. [3 marks]