

MATA32 – Winter 2010

Quiz 7 Solutions

Name: _____ KEY _____

1. Suppose the position function of an object moving along a number line is given by $s = f(t) = 2t^3 - 7t + 1$, where t is in seconds and s is in meters.

(a) Find the average velocity over the interval $[2, 2.1]$.

The total distance traveled between the time $t = 2$ and $t = 2.1$ is

$$f(2.1) - f(2) = 1.822 \text{ m}$$

Since it took 0.1 s for the object to move this distance, the average velocity is 18.22 m/s.

(b) Find the velocity when $t = 2$.

The velocity at time t is the derivative of the position, i.e. it's

$$f'(t) = 6t^2 - 7.$$

Therefore, the velocity at $t = 2$ is $f'(2) = 17 \text{ m/s}$.

2. Suppose that $y = f(x)$ and $\frac{dy}{dx} = 10$ when $x = 2$. Estimate the change in y if x changes from 2 to 2.2.

We are given that the slope of the line tangent to $y = f(x)$ at $x = 2$ is 10. This means that if x increases by a little bit from 2, then y increases by approximately 10 times as much. Therefore, if x increases by 0.2, y will increase by approximately 2.