Mathematics 122

Quiz #6 Name: Key

You must show your work to get full credit.

Let $s(t)$ be the distance, in feet, traveled by a particle t seconds after it starts moving. Assume

$$s(t) = t^2.$$

1 pt (1) What is the average speed (= average rate of change) between $t = 3$ and $t = 3.1$?

$\frac{\Delta s}{\Delta t} = \frac{s(3.1) - s(3)}{3.1 - 3} = \frac{(3.1)^2 - 3^2}{.1}$

$= 6.1$

6.1

1 pt (2) What is the average rate of change of $s(t)$ between $t = 3$ and $t = 3.01$?

$\frac{(3.01)^2 - 3^2}{.01} = 6.01$

6.01

1 pt (3) What is the average rate of change of $s(t)$ between $t = 3$ and $t = 3.001$?

$\frac{(3.001)^2 - 3^2}{.001} = 6.001$

6.001

1 pt (4) What is the average rate of change of $s(t)$ between $t = 3$ and $t = 3 + h$?

$\frac{(3+h)^2 - 3^2}{(3+h) - 3} = \frac{9 + 6h + h^2 - 9}{h}$

$= \frac{h(6+h)}{h} = 6 + h$

$6 + h$

1 pt (5) What is the instantaneous rate of change of $s(t)$ at $t = 3$?

Let $h = 0$ in problem 4 to get

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