NAME (Print!): _____

Check one: (1pm): _____
(2pm): _____

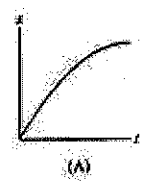
Quiz 3

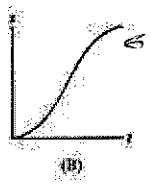
Answer the following three problems. Justify your work where appropriate.

Problem 1, 4 points: The graphs represent the position s of moving particles as a function of time t Math each graph with one of the following statements:

(1) Speeding up
(2) Speeding up and then slowing down
(3) Slowing down
(4) Slowing down and then speeding up

Slope is decreasing and only decreasing → (3)

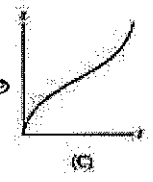


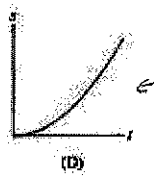


(2) →

slope increases for a while and then decreases

(4) →



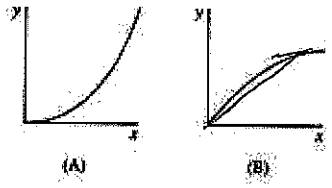


← (1)

slope only gets bigger

Slope starts big, gets small and then big again

Problem 2, 2 points: Which graph has the following property: for all x the average ROC over $[0, x]$ is greater than the instantaneous velocity at x? Explain.



(B) The average rate of change from 0 to x is less than the velocity: Since the graph bends downward the slope at a point is less than the secant slope.

Problem 3, 4 Points: The population of a city (in millions) at time t (years) is $P(t) = 2.4e^{0.06t}$, where $t = 0$ is the year 2000. When will the population double from its size at $t = 0$?

$t=0 \quad : \quad P(0) = 2.4$

when will $P(t) = 4.8$

$4.8 = 2.4\, e^{0.06t}$

$2 = e^{0.06t}$

$\ln 2 = 0.06t$

$\frac{\ln 2}{0.06} = t$

$t \approx 11.55$ years

2011-2012