MTH 2414 Qualitative Assessment 0 Name: Key

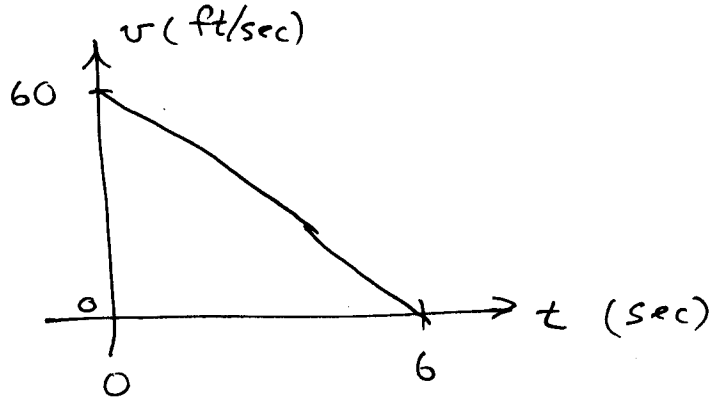
Instructions: You may use your notes, book and calculator, but not the paper of another person. Please explain our answers and write them in complete sentences. The papers will be graded for clarity and completeness (10 pts), correctness of computations and math (15 pts) and style and neatness (5 pts). **Remember**, your explanations of how you got your results are as important as the answers themselves.

Scenario: Sam speeds at 60 feet per second. Sam slams on the brakes. Sam's slows to a stop (with negative acceleration) at a constant rate. Sam stops in 6 seconds.

1. What is the shape of the graph of Sam's velocity over time? Sketch it.

With constant, negative acceleration, the velocity graph is a straight line w/ negative slope. This is because $\frac{d\,\text{velocity}}{dt}$ = acceleration.

The points determining the line are (0, 60) & (6, 0)



2. How far did Sam travel from the time he started braking to when he came to a stop?

Hint: position (or distance traveled) is the anti-derivative of velocity.

Since ~~velocity~~ Position ~~distance traveled~~ is the anti-derivative of velocity, we can use the Fundamental Theorem of calculus to calculate the distance traveled from $t=0$ to $t=6$ as

$$X(6) - X(0) = \int_0^6 v(t)\,dt$$

$$= \text{area of triangle in graph}$$

$$= \frac{1}{2} \cdot 6^{\text{sec}} \cdot 60\ \text{ft/sec} = 180\ \text{ft}.$$

So the distance traveled is 180 ft.