

In class work 6 has questions 1 through 2 with a total of 10 points. Turn in your work at the end of class *on paper*. This assignment is due *Wednesday 27 September 13:15 PM*.

1. As a function of time t (seconds), the position s (feet) of a 44 horsepower 1952 Farmall ® tractor moving along a flat piece of Floyd Creek Road is given by $s = 2t^{3/2}$. This relation holds for $1 \leq t \leq 9$.

1 (a) Find the *displacement* of the tractor on the time interval $[1, 9]$.

1 (b) Find the *average velocity* of the tractor on the time interval $[1, 9]$.

1 (c) Find the *velocity* of the tractor at the time $t = 1$. That is, find $\left. \frac{ds}{dt} \right|_{t=1}$.

1 (d) Find the *velocity* of the tractor at the time $t = 9$. That is, find $\left. \frac{ds}{dt} \right|_{t=9}$.

1 (e) Find the *acceleration* of the tractor at the time $t = 2$. That is, find $\left. \frac{d^2 s}{dt^2} \right|_{t=9}$.

1 (f) Show that av , where v is the velocity and a is the acceleration of the tractor is a constant¹ for times t in the interval $[1, 9]$.

¹For acceleration with a constant power, av is constant. For the most part, internal combustion engines deliver constant power, making acceleration of an automobile different from acceleration with a constant force. But starting from a stop, initially a car accelerates with a constant force.

2. The position s of my pet American Fuzzy Lop rabbit Wilber moving along a line as a function of time t is $s = \frac{1}{2}t^2 - 2t + 4$, where we consider positive values of s to be to the right and negative to the left.

1 (a) When is Wilber moving to the right? That is, when is $\frac{ds}{dt} > 0$?

1 (b) When is Wilber moving to the left? That is, when is $\frac{ds}{dt} < 0$?

1 (c) Find Wilber's *speed* when $t = 2$.

- 1 (d) When is Wilber's *speed* zero?