Velocity / average = Total distance / Total Time = $\frac{s}{t}$

Name _____

GRAPHS OF MOTION 1

$\frac{13}{13} = 1$ 1 min = 60 sec $\left(\frac{1\text{ min}}{60\text{ sec}} = 1 = \frac{60\text{ sec}}{1\text{ min}}\right)$

1. A racer covered a 4500 m course in 18 minutes. Calculate the velocity in meters per second.

$V_{avg} = \frac{s}{t} = \frac{4500\text{ m}}{18\text{ min}} = 250\frac{\text{m}}{\text{min}} \cdot \frac{1\text{ min}}{60\text{ sec}} = 4.16 \approx 4.2\text{ m/s}$

2. Jane ran at a constant speed of 2.75 m/s for 30 minutes. How far did she run in meters? Km?

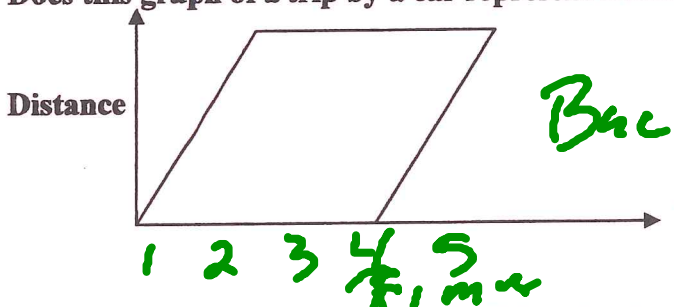
$V = \frac{s}{t}$ so $s = vt = (2.75\text{ m/s})(1800\text{ s}) = 4950\text{ m} = 4.95\text{ Km}$

3. A photon of light travels at 3×10^8 m/s (the speed limit of the universe). If it takes light about 9 minutes to reach Earth from the sun, what is the Earth-Sun distance?

note #2

$s = vt = (3\times10^8\text{ m/s})(540\text{ s}) = 1620\times10^8\text{ m} = 1.62\times10^{11}\text{ m}$

4. Does this graph of a trip by a car represent a real situation? Explain.



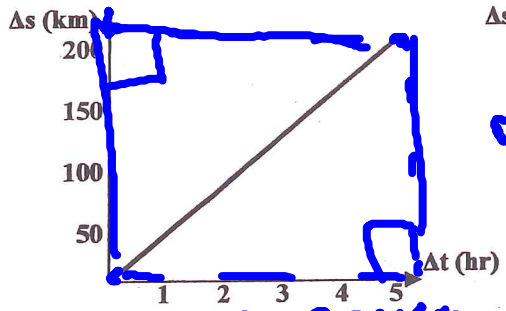
NOT Backwards Time

5. A car drives on a road at a speed of 35 mph. Convert this into m/s and compare the distance the car travels in one second to the size of our classroom.

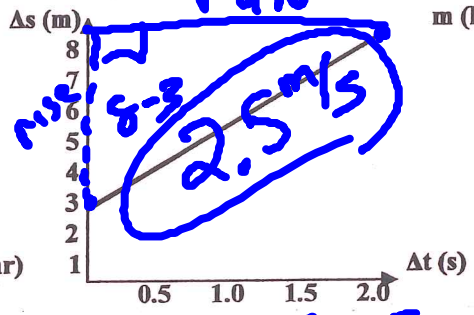
1 m/s = 2.237 mi/hr

$35\frac{\text{mi}}{\text{hr}} \cdot \frac{1\text{ m/s}}{2.237\frac{\text{mi}}{\text{hr}}} = 15.6\text{ m/s}$

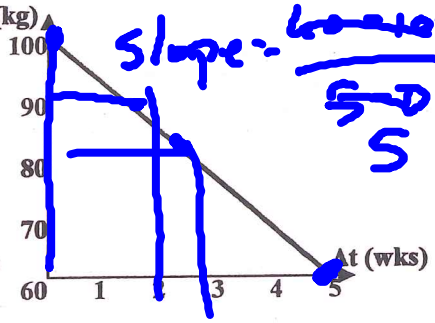
6. Calculate the slope of the following graphs. Be sure to state units.



Slope = $\frac{\text{rise}}{\text{run}} = \frac{200\text{ km}}{5\text{ hr}}$ (40 km/hr)

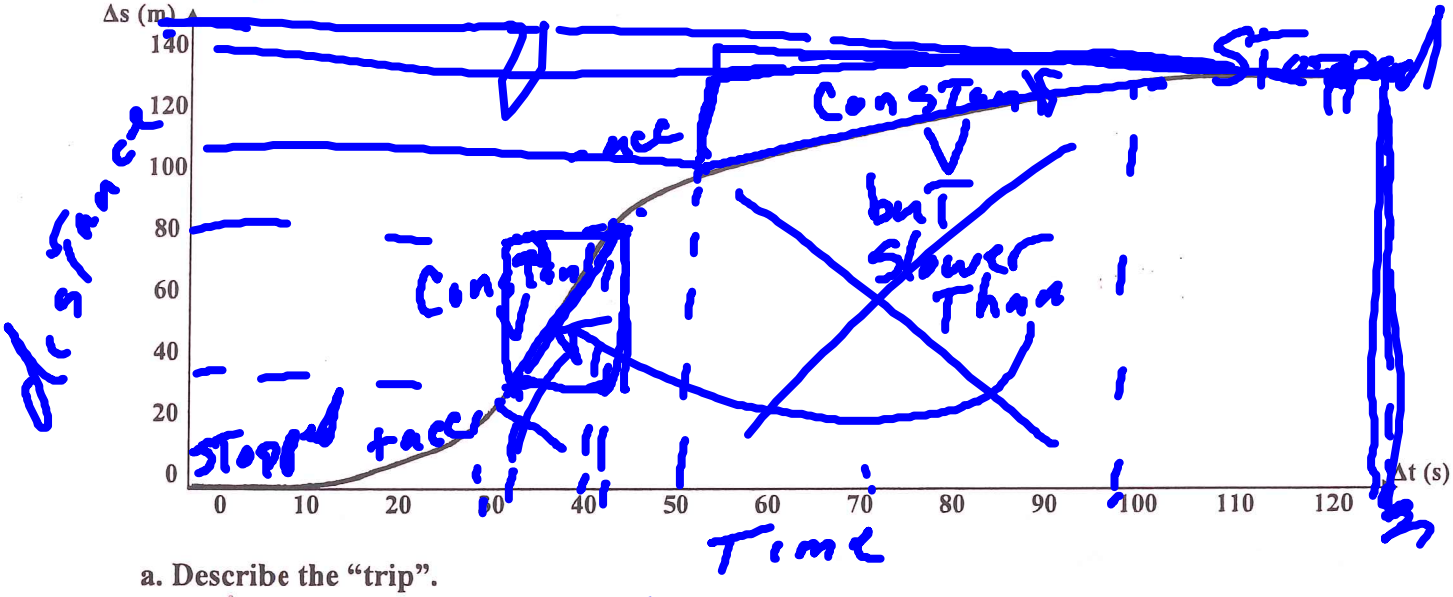


Slope = $\frac{\text{rise}}{\text{run}} = \frac{5\text{ m}}{2\text{ s}}$ $\frac{5\text{ m}}{2\text{ s}} = 2.5\text{ m/s}$



Slope = $\frac{-40}{5-0} = \frac{-40}{5}$ $\frac{-10}{1}$ $-8\frac{\text{kg}}{\text{wks}}$

7. Refer to the graph.



a. Describe the "trip".

Note Graph

b. At what time is the person going the fastest? Calculate this speed.

30-40s Speed = slope = rise/run = 55/10 = 5.5 m/s

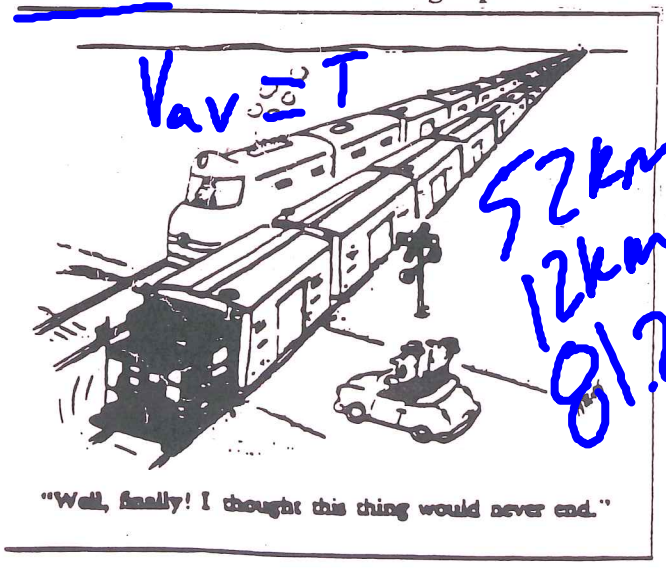
c. How fast is the person going at time 70 seconds?

Speed = Slope = $\frac{140-100}{50} = \frac{40}{50} = .8$ m/s

d. What is the average speed for the entire trip?

$V_{av} = \frac{\text{Total distance}}{\text{Total Time}} = \frac{145m}{130s} = 1.1$ m/s

8. A train travels 100 km/hr for 0.52 hr, then 50 km/hr for the next 0.24 hr, and finally 125 km/hr for the last 0.65 hr. What is the average speed of the train for this trip?



$V_{av} = \frac{\text{Total distance}}{\text{Total Time}}$

52km $V_{av} = \frac{145.25\text{km}}{1.41\text{hr}} = 103.01$ km/hr

12km

81.25km