$V_{average} = \frac{\text{Total distance}}{\text{Total Time}} = \frac{S}{t}$

$\frac{5}{5}=1$ $\frac{7}{7}=1$ $\frac{13}{13}=1$

Name _____

GRAPHS OF MOTION 1

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

$V = \frac{S}{t} = \frac{4500\,m}{18\,min} = 250\frac{m}{min} \cdot \frac{1\,min}{60\,sec} = 4.1\frac{m}{s}$

$\frac{60s}{1min} = \frac{1min}{60s}$

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

$S = Vt = (2.75\,m/s)(1800s) = 4,950\,m$

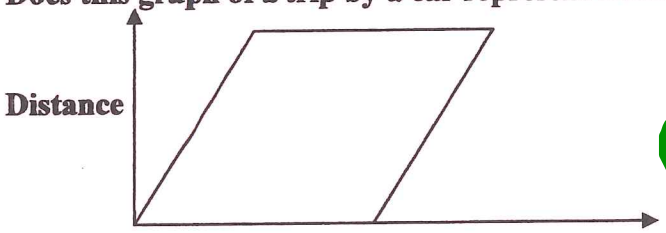
4.95 km

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?

$S = Vt = (3\times10^{8}\,m/s)(540\,s) = 1620\times10^{8}\,m/s$

$1.62\times10^{11}\,m/s$

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



NO

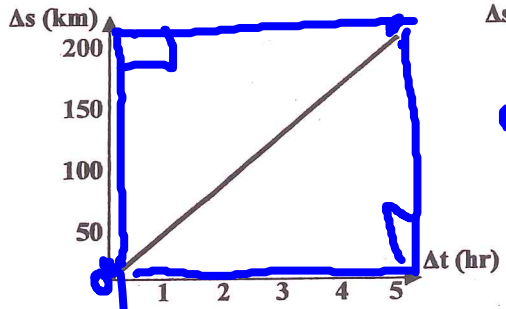
Cannot go back in Time

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.

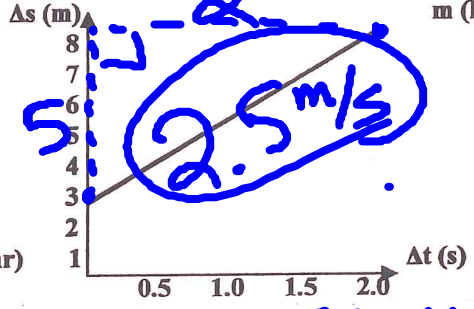
$1\,m/s = 2.237\,\frac{mile}{hr}$

$35\,\frac{miles}{hour} \cdot \frac{1\,m/s}{2.237\,miles/hr} = 15.6\,m/s$

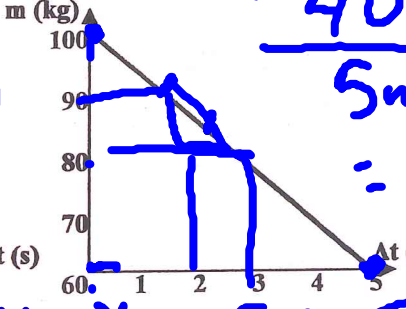
6. Calculate the slope of the following graphs. Be sure to state units.



Slope $= \frac{200\,km}{5\,hr} = 40\,\frac{km}{hr}$



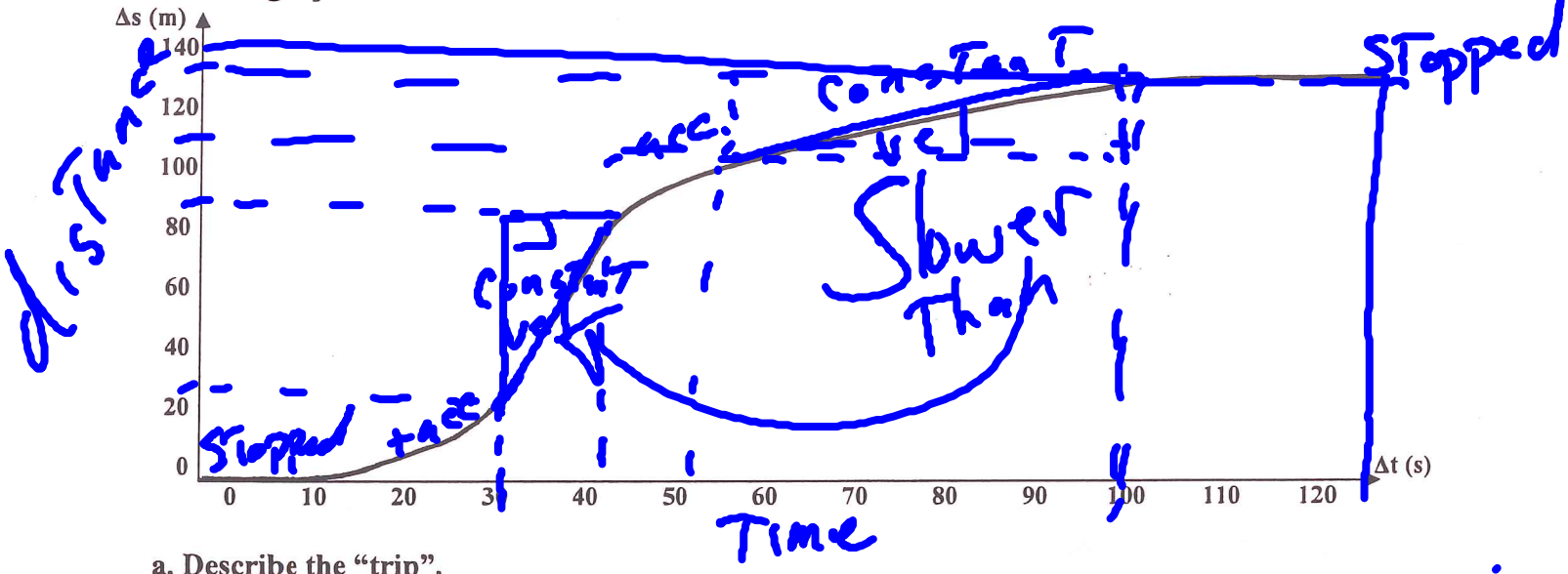
$\frac{-2}{5} = -2.5\,m/s$



$\frac{-40\,kg}{5\,wk} = -8\,\frac{kg}{wk}$

Slope $= \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5m}{25} = 2.5\,m/s$

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 Slope = Speed = $\frac{80-20}{40-30} = \frac{60}{10} = 6.1\frac{m}{s}$

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

$V = \text{slope} = \frac{20}{50} = .4\frac{m}{s}$

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

$V_{av} = \frac{\text{Total distance}}{\text{Total Time}} = \frac{140\text{ m}}{130\text{s}} = 1.1\frac{m}{s}$

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?

52 km

$V_{av} = \frac{S_{TOTAL}}{T_{TOTAL}} = \frac{145.25\text{ km}}{1.41\text{ hr}} = 103\frac{km}{hr}$

.52	52
.24	12
.65	81.25
1.41	145.25