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

Name 7

$\frac{13}{13} = 1$ $\quad 1\,min = 60\,sec$

$\frac{1\,min}{60\,sec} = \frac{60\,sec}{1\,min} = 1$

GRAPHS OF MOTION 1

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

$V = \frac{S}{t} = \frac{4500\,m}{18\,min} = 250\,\frac{m}{min} \cdot \frac{1\,min}{60\,sec} = 4.16\,m/s$

4.2 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 $S = Vt = (2.75\,m/s)(1800\,s) = 4950\,m$

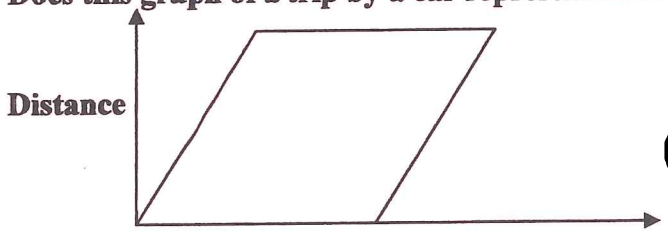
4.95 Km

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?

$V = \frac{S}{t}$ so $S = Vt = (3 \times 10^8\,m/s)(540\,s) = 1.62 \times 10^{11}\,m$

$V = 1.62 \times 10^{11}\,m$

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



NO

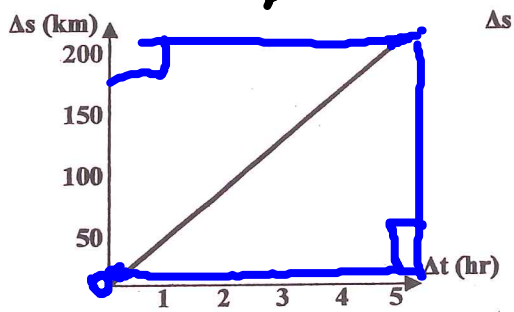
Cannot go back in Time

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.

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

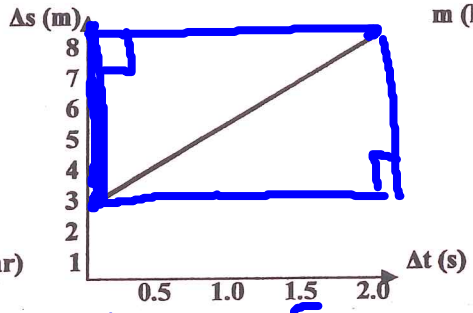
$35\,\frac{miles}{hr} \cdot \frac{1\,m/s}{2.23\,\frac{miles}{hr}} \approx 16\,m/s$

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



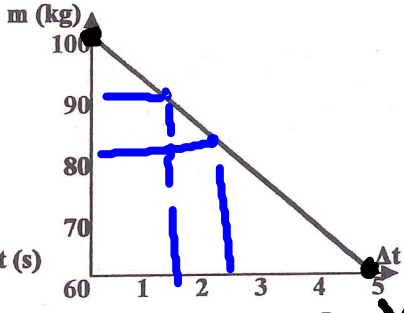
$slope = \frac{200\,Km}{5\,sec}$

$slope = 40\,\frac{Km}{sec}$



$slope = \frac{5\,m}{2\,s}$

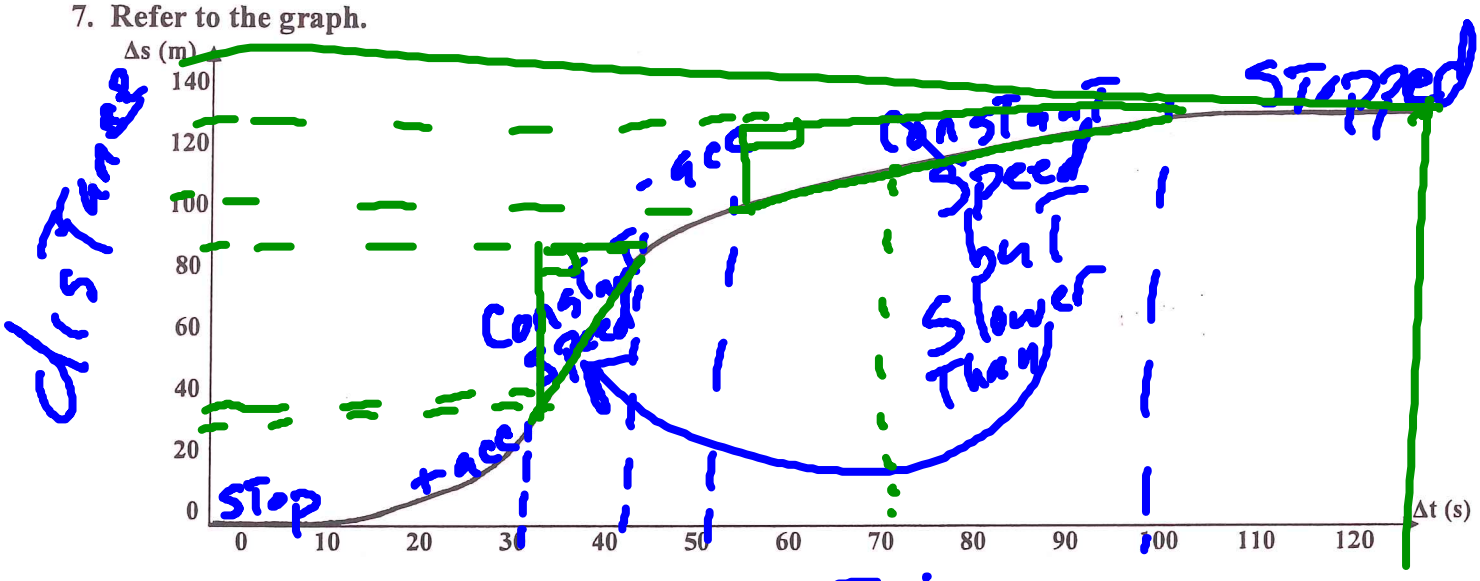
$= 2.5\,m/s$



$slope = \frac{rise}{run} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{80 - 100}{5 - 0}$

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

7. Refer to the graph.



a. Describe the "trip".

Note Graph Time

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

From 30-40 s speed = slope = $\frac{85-30}{10} = 5.5\frac{m}{s}$

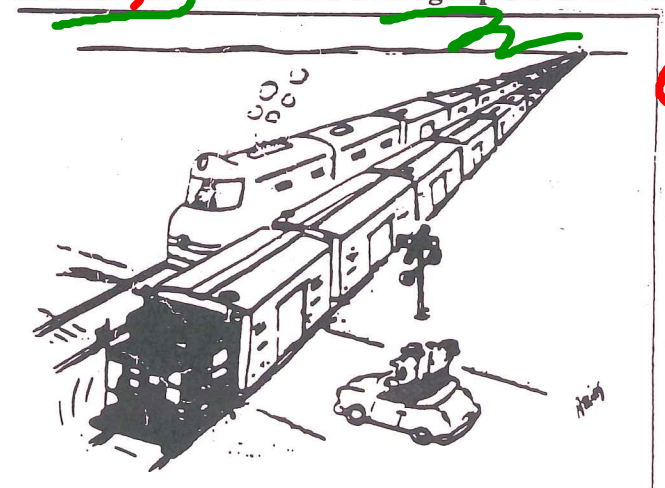
c. How fast is the person going at time 70 seconds?

Speed = Slope = $\frac{25}{50} = \frac{1}{2} = .5\ m/s$

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

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

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?



$\frac{52 + 12 + 81.25}{.52 + .24 + .65} =$

103.01 km/hr