$V_{av} = \frac{\text{distance}}{\text{Time}} = \frac{s}{t}$

12

Name_____

GRAPHS OF MOTION 1

1 min = 60 s

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

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

$V = \frac{s}{t} = \frac{4500\text{ m}}{18\text{ min}} \cdot \frac{1\text{ min}}{60\text{ s}} = \frac{4500\text{ m}}{1080\text{ s}} = 4.17\text{ m/s}$

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

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

$s = vt = (2.75\text{ m/s})(1800\text{ s}) = 4,950\text{ m}$

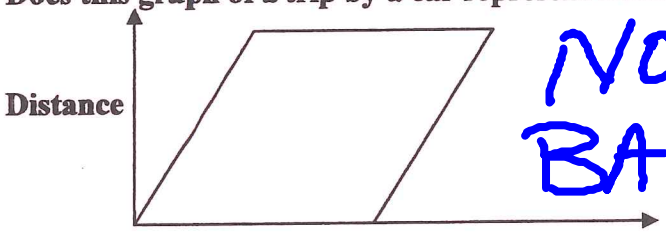
4.95 km

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?

$s = vt = (3 \times 10^8\text{ m/s})(540\text{ s}) = 1620 \times 10^8\text{ m}$

$1.62 \times 10^{11}\text{ m}$

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

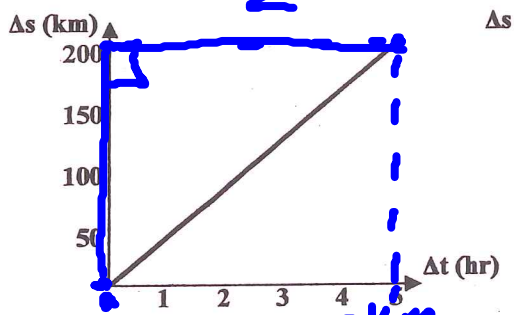


NO
BACK IN TIME

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.

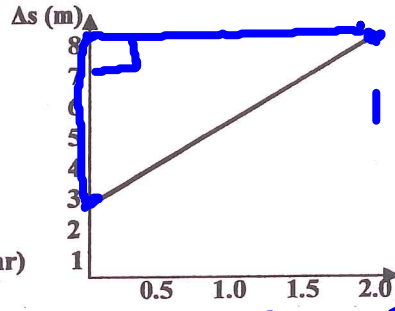
$35\frac{\text{miles}}{\text{hr}} \times \frac{1\text{ m/s}}{2.237\frac{\text{miles}}{\text{hr}}} = 15.65\text{ m/s}$

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



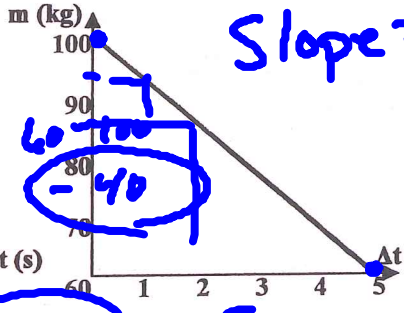
2

$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{200\text{ km}}{5\text{ hr}} = 40\frac{\text{km}}{\text{hr}}$



1

$\text{slope} = \frac{5\text{ m}}{25} = 2.5\text{ m/s}$



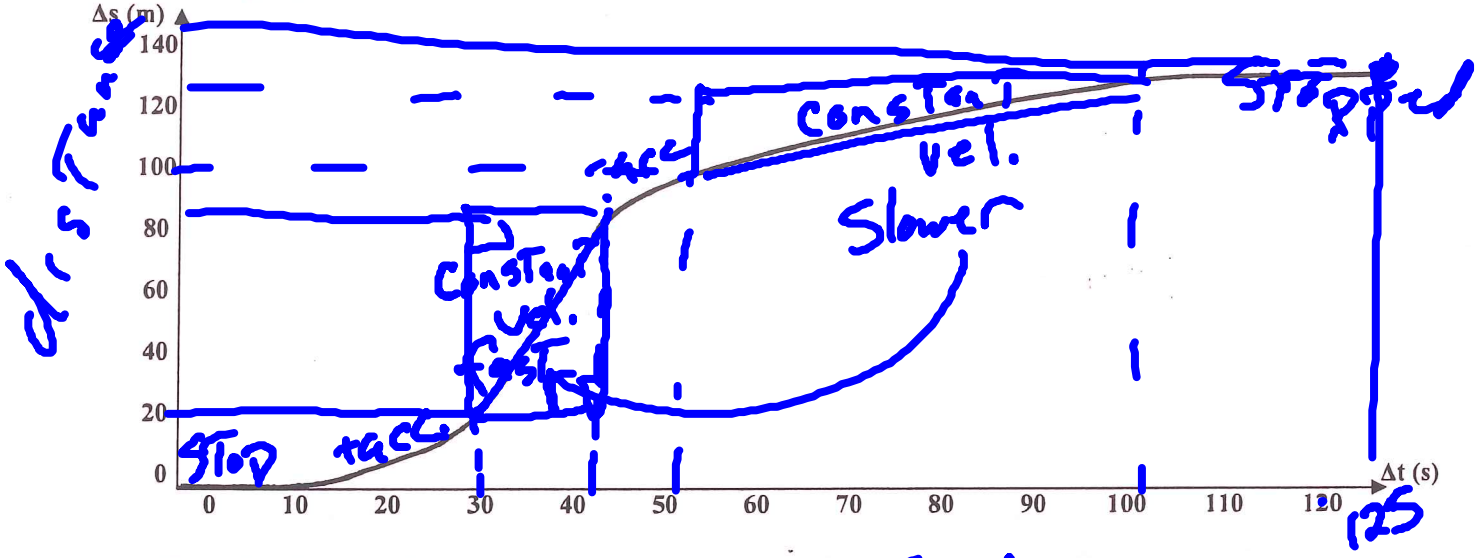
$\text{Slope} = \frac{\text{rise}}{\text{run}}$

$\frac{-40}{5}$

5

$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-40\text{ kg}}{5\text{ wks}} = -8\text{ kg/wk}$

7. Refer to the graph.



a. Describe the "trip".

Note graph

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

30-40 s $\frac{85-20}{42-30} = \frac{65\text{ m}}{12\text{ s}} = 5.49\text{ m/s}$

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

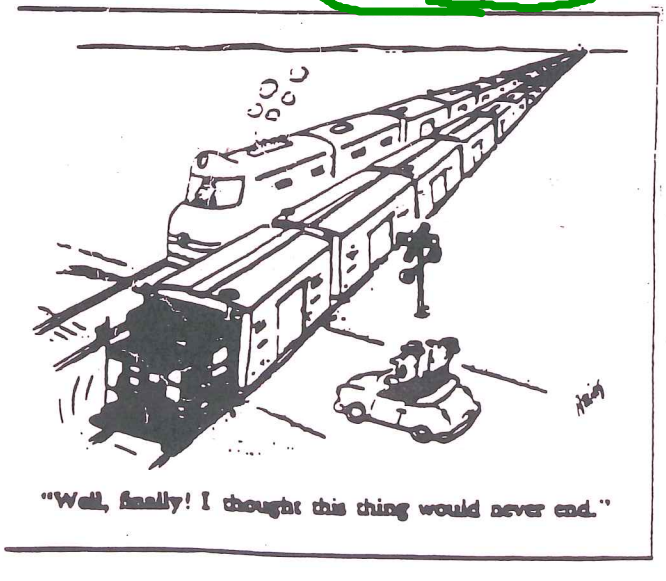
Slope $= \frac{122-100}{100-50} = \frac{22}{50\text{ m}} = .44\text{ m/s}$

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

$V_{avg} = \frac{s}{t} = \frac{142}{125\text{ s}} = 1.1\text{ m/s}$

52 km

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?



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

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

52 km .52

12 km .24

81.25 km .65

145.25 km 1.41 hr