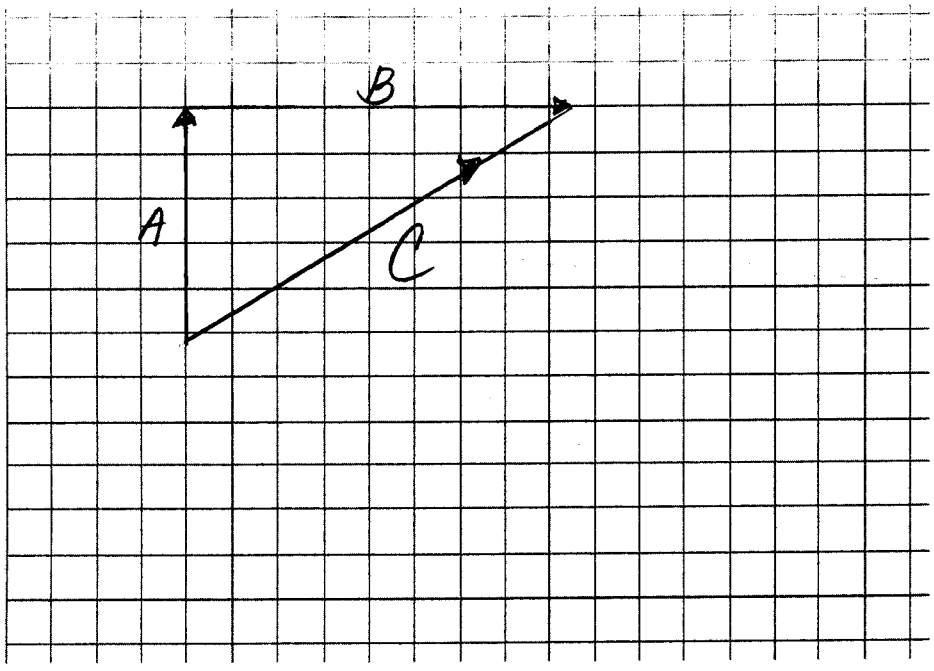
PART IIA. VECTORS

1. A person runs 3 km North and 5 km East.

a) How far (distance) did he travel? *(8 km)*

3 + 5 = 8 km

b) What is his displacement? Find the resultant (magnitude and direction) by the head-to-tail method.



DATA:
A (3 km, N)
B (5 km, E)

SCALE:
1 cm = 1 km

Resultant: 5.8 km, NE

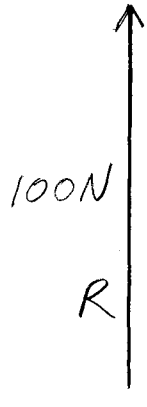
c) Find the magnitude of the resultant with the mathematical method. *(5.83 km)*

$R = \sqrt{3^2 + 5^2} = 5.83$ km

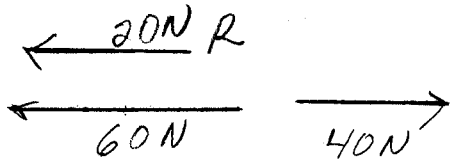
For problems 2-4 draw each vector and the resultant vector to scale.

2. An 40-N and a 60-N force act concurrently (**at the same time**) on an object. Find the magnitude of the resultant if the forces pull in the same direction. **(100 N)**

40 + 60 = 100 N

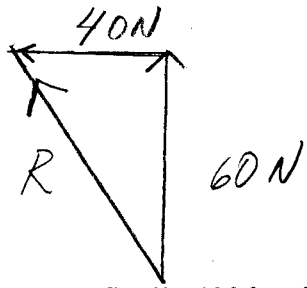


3. In opposite directions. **(20 N)**



60 - 40 = 20 N

4. At a right angles to each other. (72.1 N)



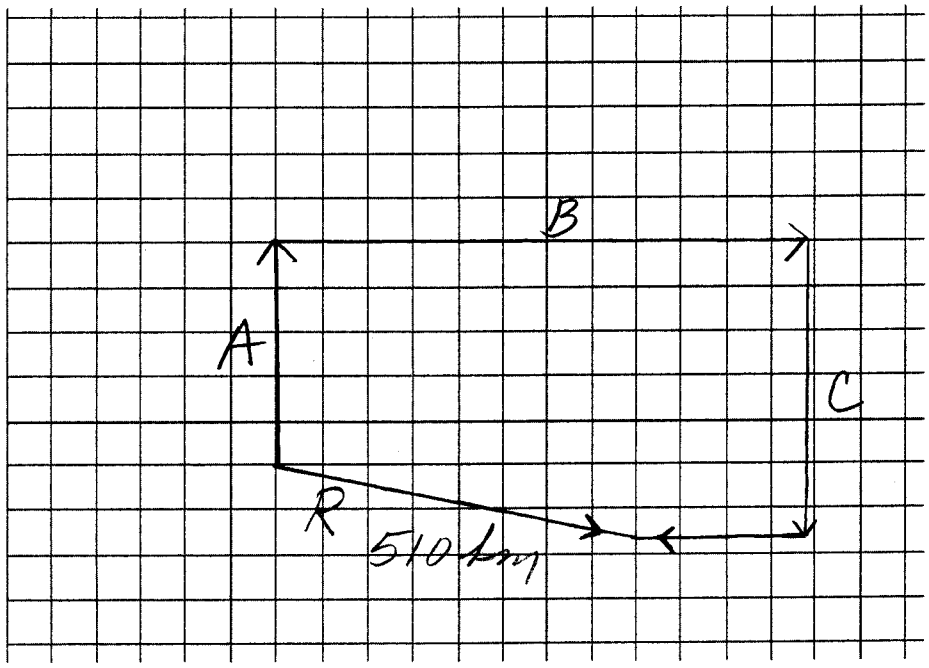
72.1 N

5. A jet pilot flies 300 km North, then 700 km East to an airport, then finally 400 km South to another airport and 200 km West to his final destination.

a) What is the total distance covered by the plane? *(1600 km)*

300 + 700 + 400 + 200 = 1600 km

b) What is the pilot's displacement from the original point of take off? Find the resultant by the head-to-tail method.



DATA:

A 300 km, N
B 700 km, E
C 400 km, S
D 200 km, W

SCALE:

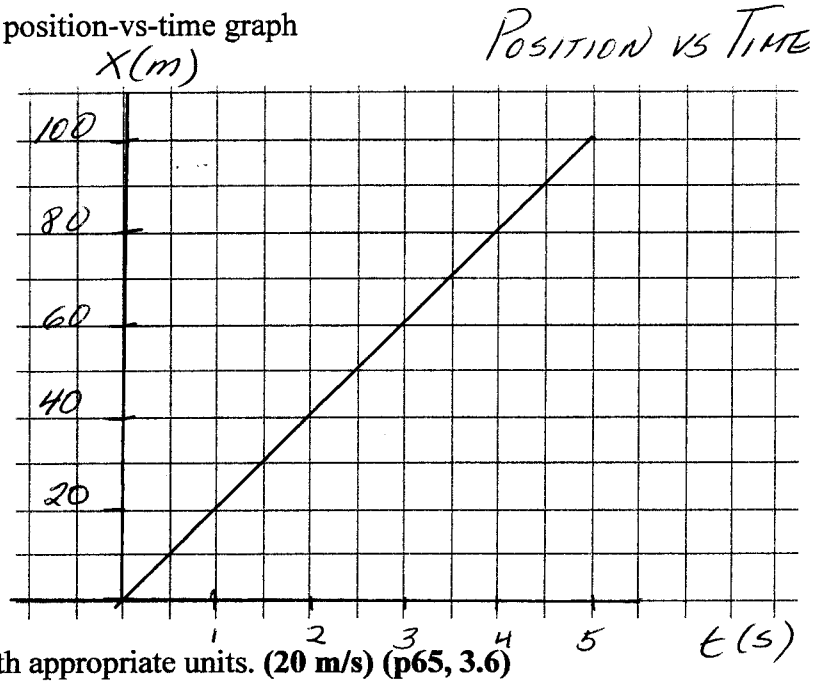
1 cm = 100 km

Resultant : 510 km, SE

PART II B. GRAPHS

1. Graph the following data on a position-vs-time graph

Position (m)	Time (s)
0	0
20	1
40	2
60	3
80	4
100	5



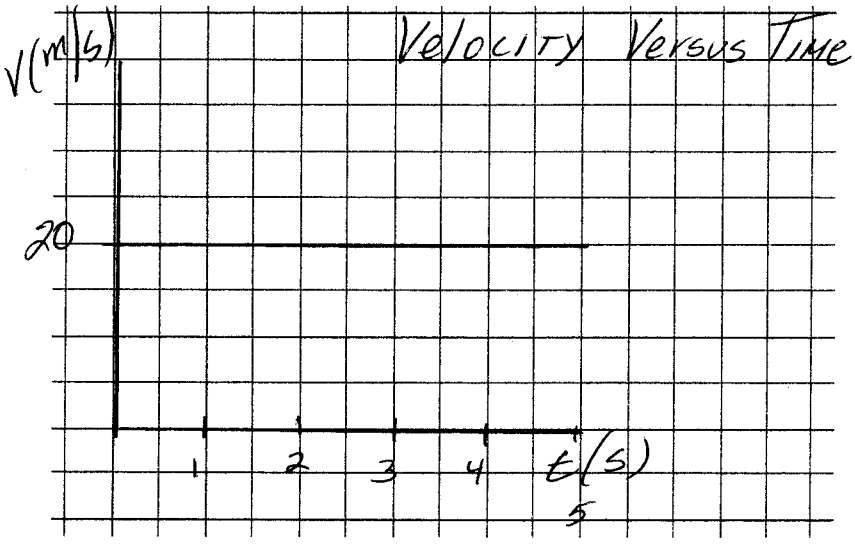
2. Find the slope of the graph with appropriate units. **(20 m/s) (p65, 3.6)**

$$\text{Slope} = \frac{x_2 - x_1}{t_2 - t_1} = \frac{80 - 20}{4 - 1} = \frac{60}{3} = 20 \text{ m/s}$$

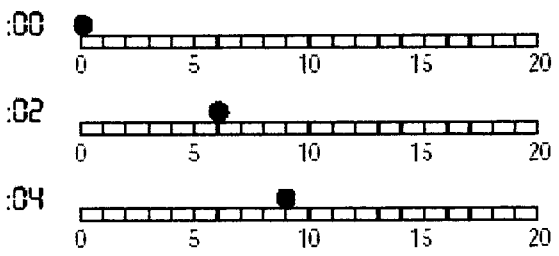
3. What does the slope of a position-time graph represent?

Velocity

4. Using the value found on part **3)** graph the velocity vs. time for the 5 seconds.



UNDERLINE the answers to the questions of the motion of the Little Dots. **(Refer to Little Dudes activities)**



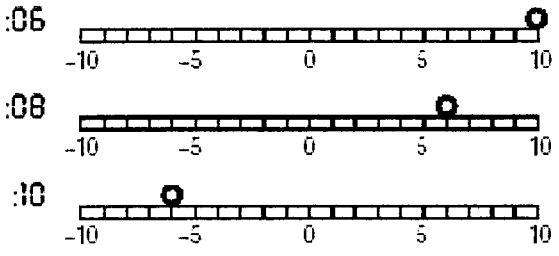
5.

Motion: **(speeding up)** or **(not moving)**

or **(slowing down)** or **(at constant speed)**

Position (+) or (-) *Velocity* (+) or (-) or **(0)**

Acceleration (+) or (-) or **(0)**



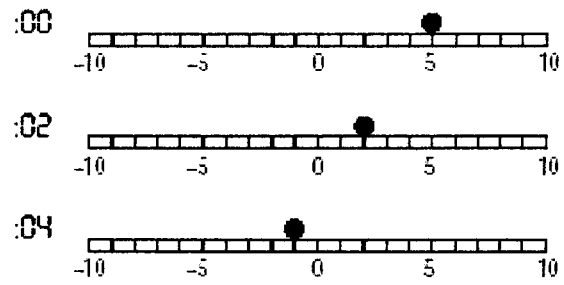
6.

Motion: **(speeding up)** or **(not moving)**

or **(slowing down)** or **(at constant speed)**

Position (+) or (-) *Velocity* (+) or (-) or **(0)**

Acceleration (+) or (-) or **(0)**



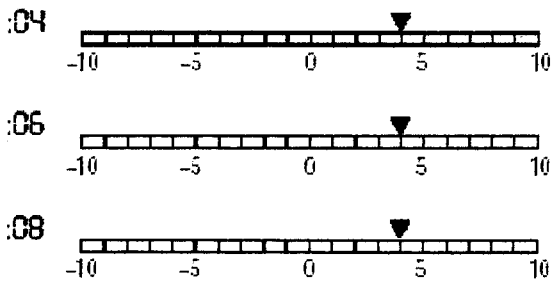
7.

Motion: **(speeding up)** or **(not moving)**

or **(slowing down)** or **(at constant speed)**

Position (+) or (-) *Velocity* (+) or (-) or **(0)**

Acceleration (+) or (-) or **(0)**



8.

Motion: **(speeding up)** or **(not moving)**

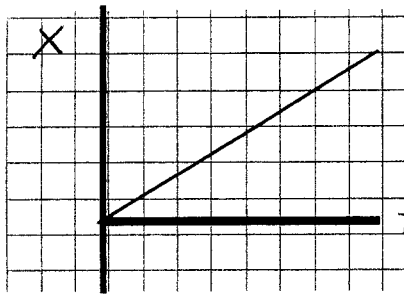
or **(slowing down)** or **(at constant speed)**

Position (+) or (-) *Velocity* (+) or (-) or **(0)**

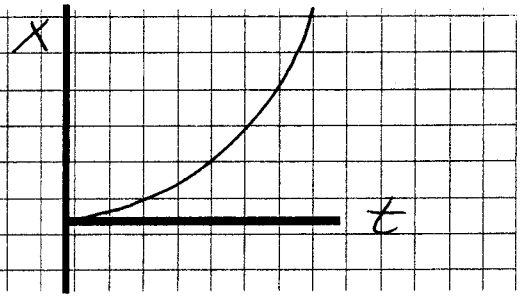
Acceleration (+) or (-) or **(0)**

9. Sketch the graph that represents the motion of a car.

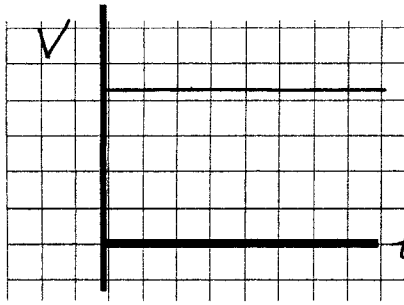
a. *Position versus Time* graph
Car moving in the positive direction
at constant speed



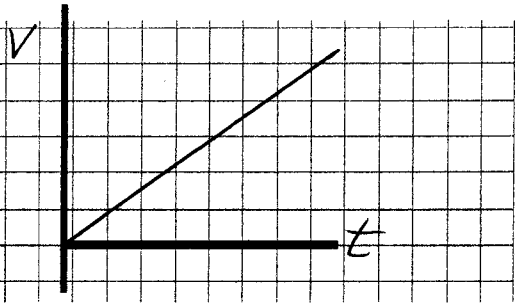
b. *Position versus Time* graph
Car moving in the positive direction
with positive acceleration



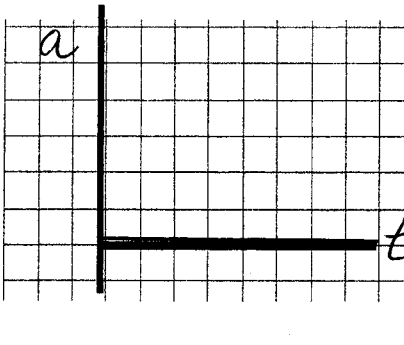
c. *Velocity versus Time* graph
Car moving in the positive direction
at constant speed



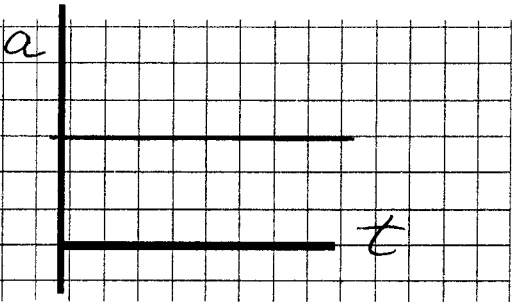
d. *Velocity versus Time* graph
Car moving in the positive direction
with positive acceleration



e. Acceleration *versus Time* graph
Car moving in the positive direction
at constant speed



b. *Acceleration versus Time* graph
Car moving in the positive direction
with positive acceleration



PART II C. UNIT CONVERSION:

ITEMS TO MEMORIZE:

1 km = 1000 m	$F_g = mg$	g = 10 m/s^2
1 m = 100 cm	from m/s to km/h MULTIPLY by 3.6	
1 kg = 1000 g	from km/h to m/s DIVIDE by 3.6	

Convert the following numbers.

1. 20 cm to m $20\text{ cm} \left/ \frac{1\text{ m}}{100\text{ cm}} \right. = 0.2\text{ m}$

2. 1250 cm to m $1250\text{ cm} \left/ \frac{1\text{ m}}{100\text{ cm}} \right. = 12.5\text{ m}$

3. 3510 m to km $3510\text{ m} \left/ \frac{1\text{ km}}{1000\text{ m}} \right. = 3.51\text{ km}$

4. 4.8 km to m $4.8\text{ km} \left/ \frac{1000\text{ m}}{1\text{ km}} \right. = 4800\text{ m}$

5. 150 km/h to m/s $\frac{150\text{ km/h}}{3.6} = 41.67\text{ m/s}$

6. 28 m/s to km/h $28\text{ m/s}\,(3.6) = 100.8\text{ km/h}$

7. 300 g to kg $300\text{ g} \left/ \frac{1\text{ kg}}{1000\text{ g}} \right. = 0.3\text{ kg}$

8. 3.2 kg to g $3.2\text{ kg} \left/ \frac{1000\text{ g}}{1\text{ kg}} \right. = 3200\text{ g}$

9. 250 N to kg $250\text{ N} \left/ \frac{1\text{ kg}}{10\text{ N}} \right. = 25\text{ kg}$

10. 4.75 kg to N $4.75\text{ kg} \left/ \frac{10\text{ N}}{1\text{ kg}} \right. = 47.5\text{ N}$