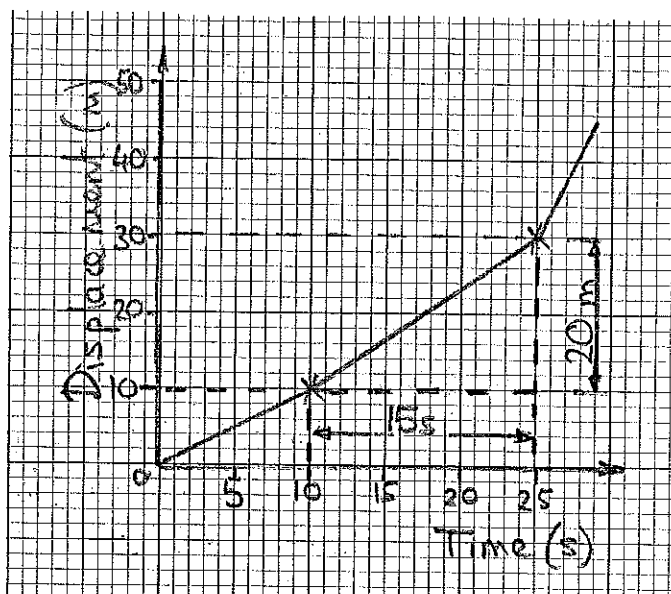


## Chapter 2: Displacement – time graphs (Rev A)

Displacement - time graphs not only tell you how the displacement varies with time, but the **gradient** of the displacement – time graph also gives the **velocity**.

If the gradient is positive (up and to the right) the velocity is positive.  
If the gradient is negative (down and to the right) then the velocity is negative.

What does a negative velocity mean? ..... *It means that the motion is in the opposite direction*



velocity =  $\frac{\text{change in displacement}}{\text{time taken}}$

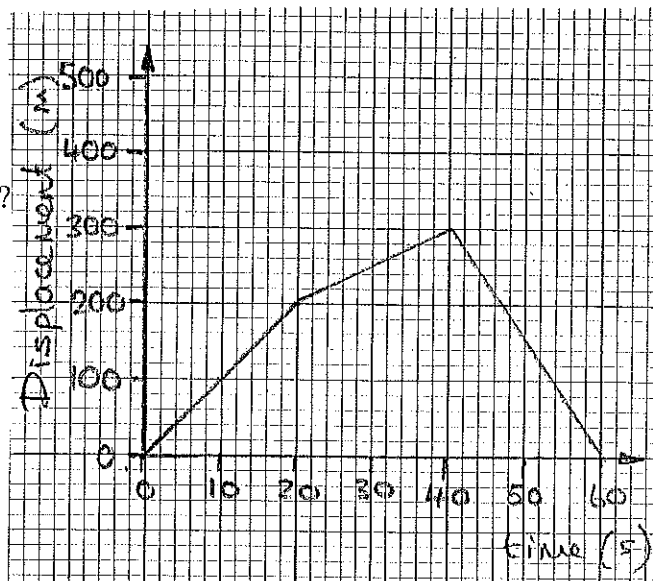
The velocity between time = 10s and time = 25s is given by:

$$v = \frac{20\text{m}}{15\text{s}} = 1.33 \text{ m/s}$$

### Question 1

This question is about the motion of a motorbike described by a displacement-time graph.

- a) What is the maximum displacement?
- b) How far does the motorbike travel in total?
- c) What is the velocity over the first 20 seconds?
- d) What is the velocity between 20s and 40s?
- e) What is the velocity over the final 20s?
- f) What is the motorbike's maximum speed?



- g) Describe the journey (use words like accelerates, decelerates, steady speed)

### Question 2

Look at the displacement-time graph on the right.

- How far does the car go in the first 3 seconds?
  - Calculate its velocity in the first 3 seconds.
  - Describe what happens to the car from 3 to 5 seconds.
- d) Add a line to the graph to show a car that, during the first 3 seconds, travels at half the speed of the original car.

