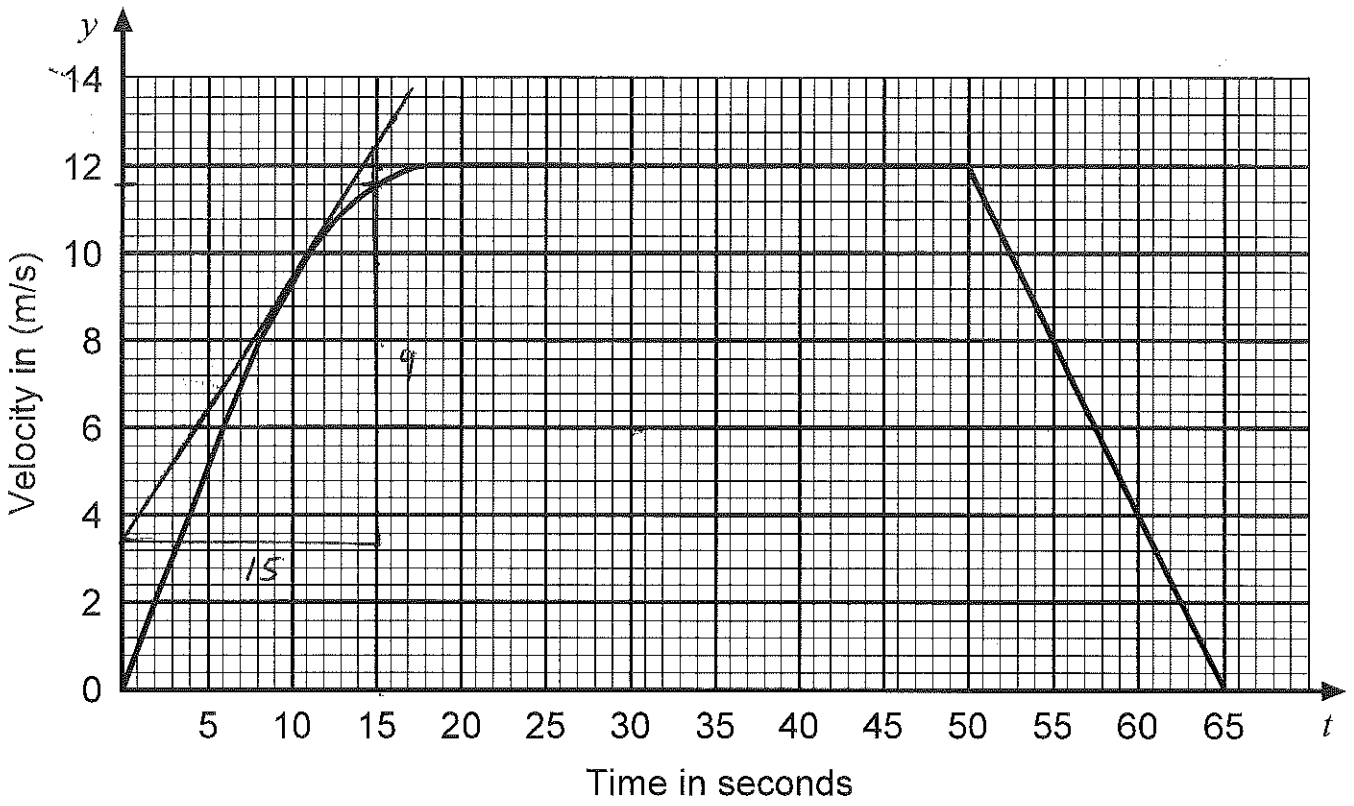
1. A car travels between two sets of traffic lights.
The diagram represents the velocity/time graph of the car.



The car leaves the first set of traffic lights.

(a)Use the graph to find the velocity of the car after 15 seconds.

.....11.6 m/s (1)

(b)Calculate an estimate for the acceleration of the car, in m/s^2, after 10 seconds.

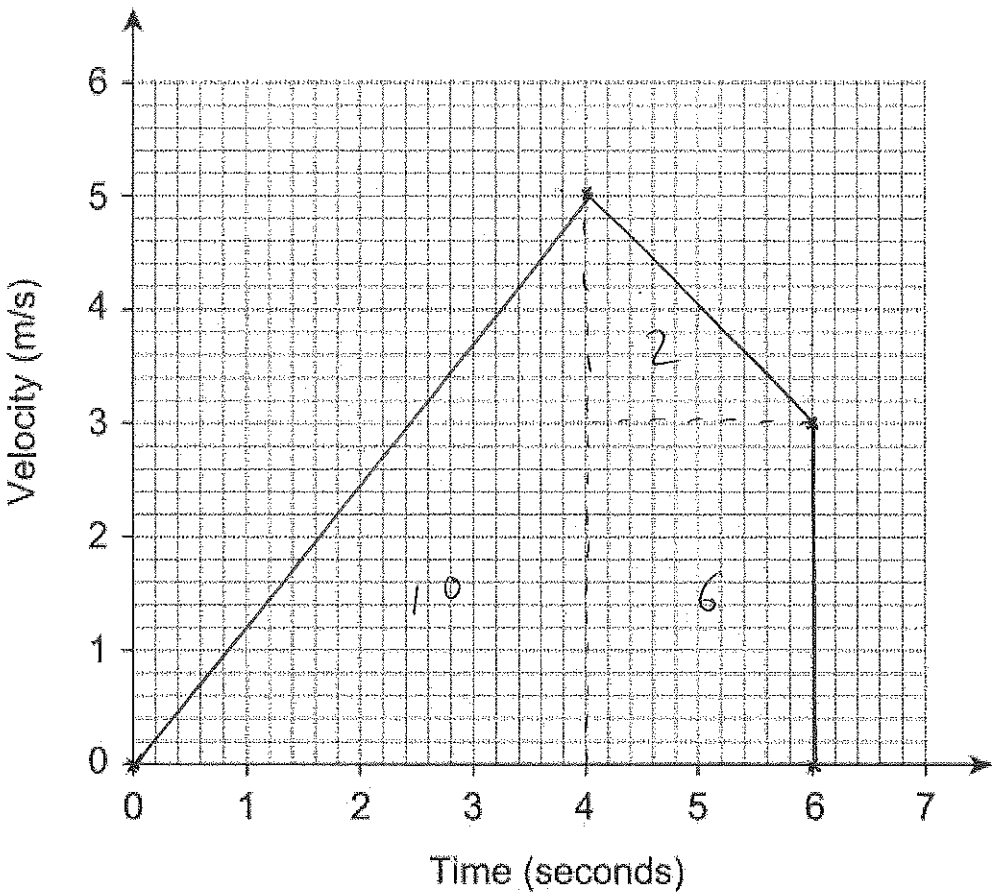
$\frac{9}{15} = \frac{3}{5} = 0.6\ m/s^2$

..... (2)

2. A toy car is placed on the floor of a sports hall.

It moves in a straight line starting from rest.
It travels with constant acceleration for 4 seconds reaching a velocity of 5m/s.
It then slows down with constant deceleration of 1m/s2 for 2 seconds.
It then hits a wall and stops.

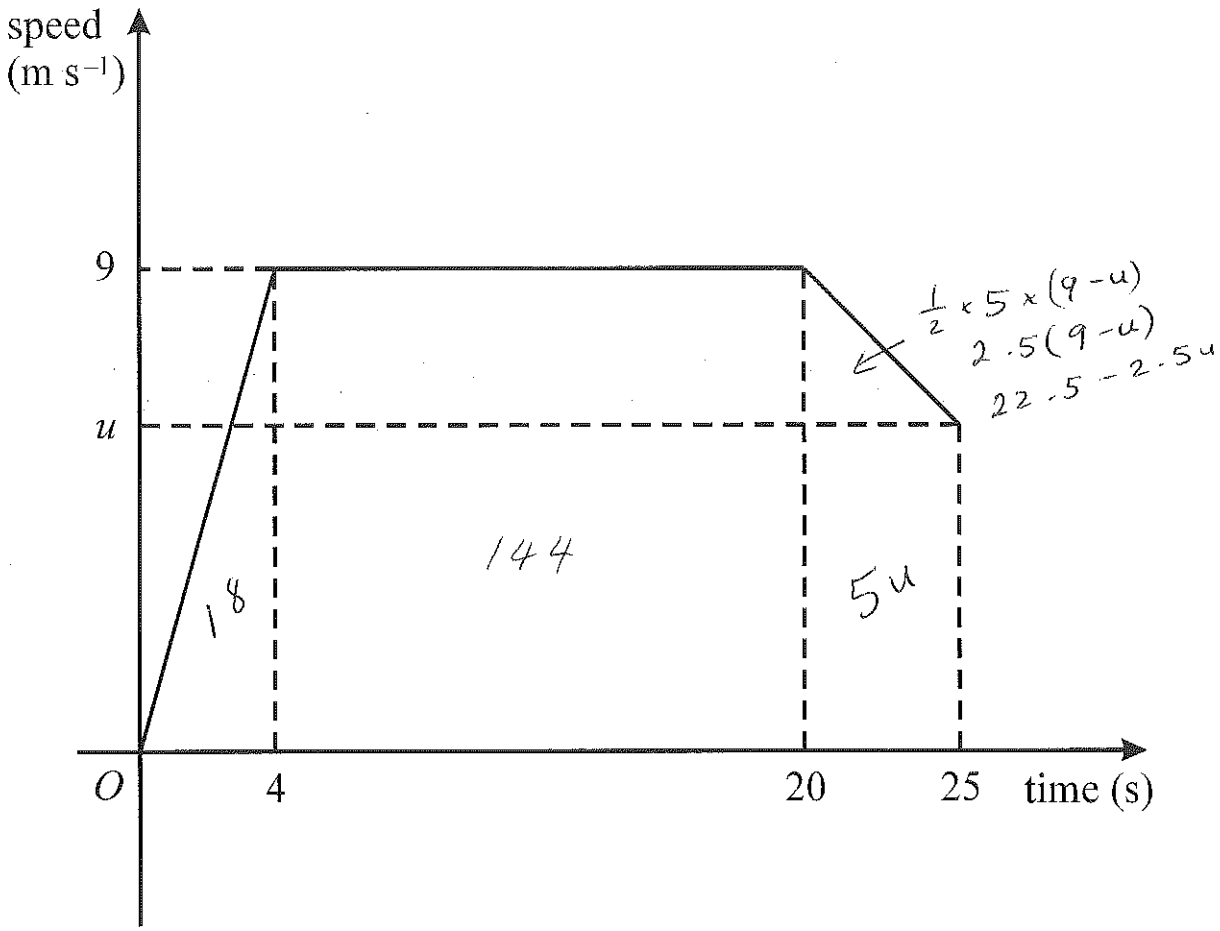
a) Draw a velocity-time graph for the toy car. (3)



b) Work out the total distance travelled by the toy car.

18 ..... m (3)

3. A sprinter runs a race of 200 m.
Her total time for running the race is 25 s.
Below is a sketch of the speed-time graph for the motion of the sprinter.



Calculate:

a) The acceleration in the first 4 seconds of the race

$\frac{9}{4}$

2.25m/s² (2)

b) The distance covered by the sprinter in the first 20 seconds of the race

162m (2)

c) The value of u

$22.5 - 2.5u + 5u = 38$

$2.5u + 22.5 = 38$

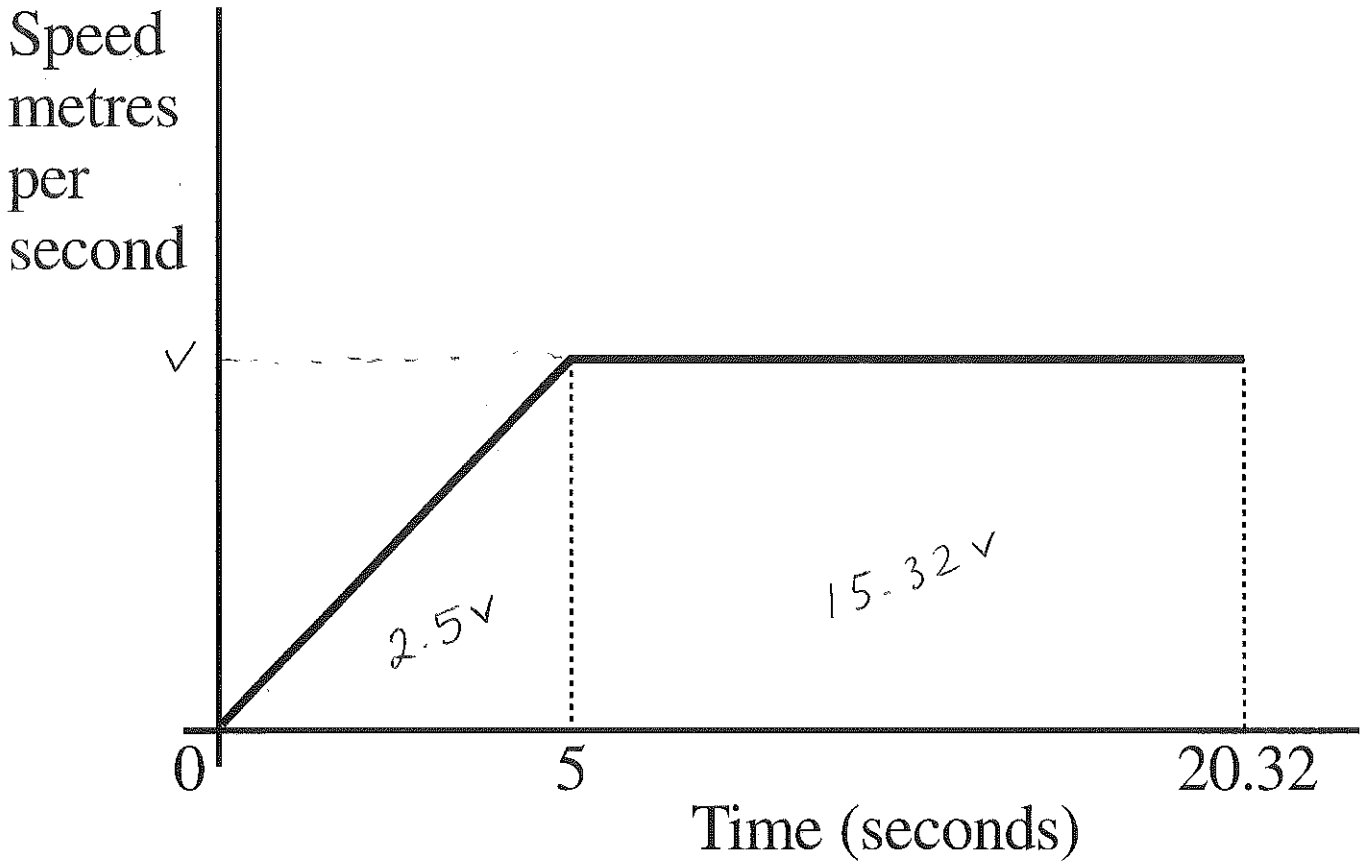
$2.5u = 15.5$

$u = \frac{15.5}{2.5}$

$= 6.2$

6.2m/s (3)

5. A sprinter runs a race of 200 m.
His total time for running the race is 20.32s.
Below is a sketch of the speed-time graph for the motion of the sprinter.



Calculate:

a) The maximum speed of the sprinter during the race

$17.82v = 200$

$v = \frac{200}{17.82}$

$v = 11.22$ m/s (2dp)

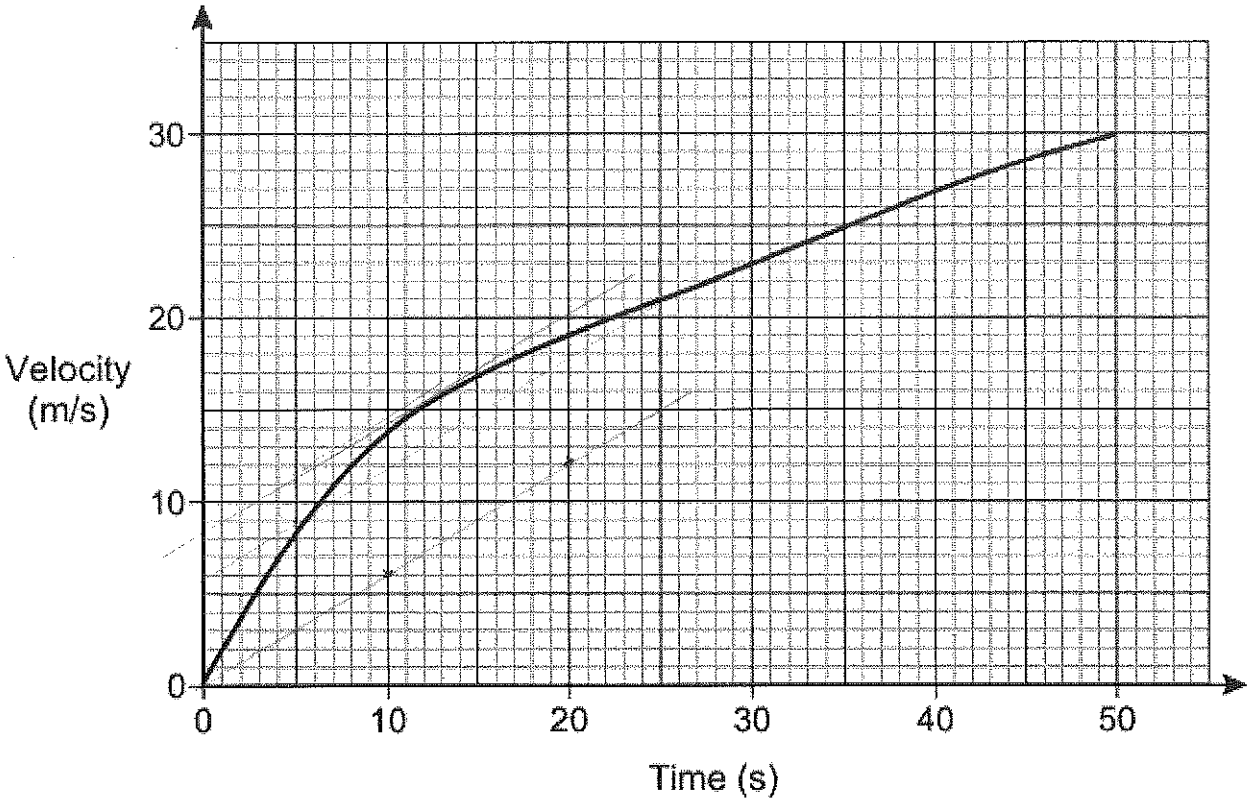
..... (4)

b) The distance covered by the sprinter in the first 5 seconds of the race

2.5×11.22

28.06m (2)
(2dp)

6. Here is the velocity-time graph of a car for 50 seconds.



Work out the average acceleration during the 50 seconds.
Give the units of your answer.

$\frac{30}{50} = 0.6 \text{ m/s}^2$

..... (2)

Estimate the time during the 50 seconds when
the instantaneous acceleration = the average acceleration
You must show your working on the graph.

...12 s... (2)