Name: _____

GCSE (1 – 9)

Velocity Time Graphs

Instructions

• Use **black** ink or ball-point pen.
• Answer all questions.
• Answer the questions in the spaces provided
– *there may be more space than you need.*
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
• You must **show all your working out.**

Information

• The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
• Check your answers if you have time at the end

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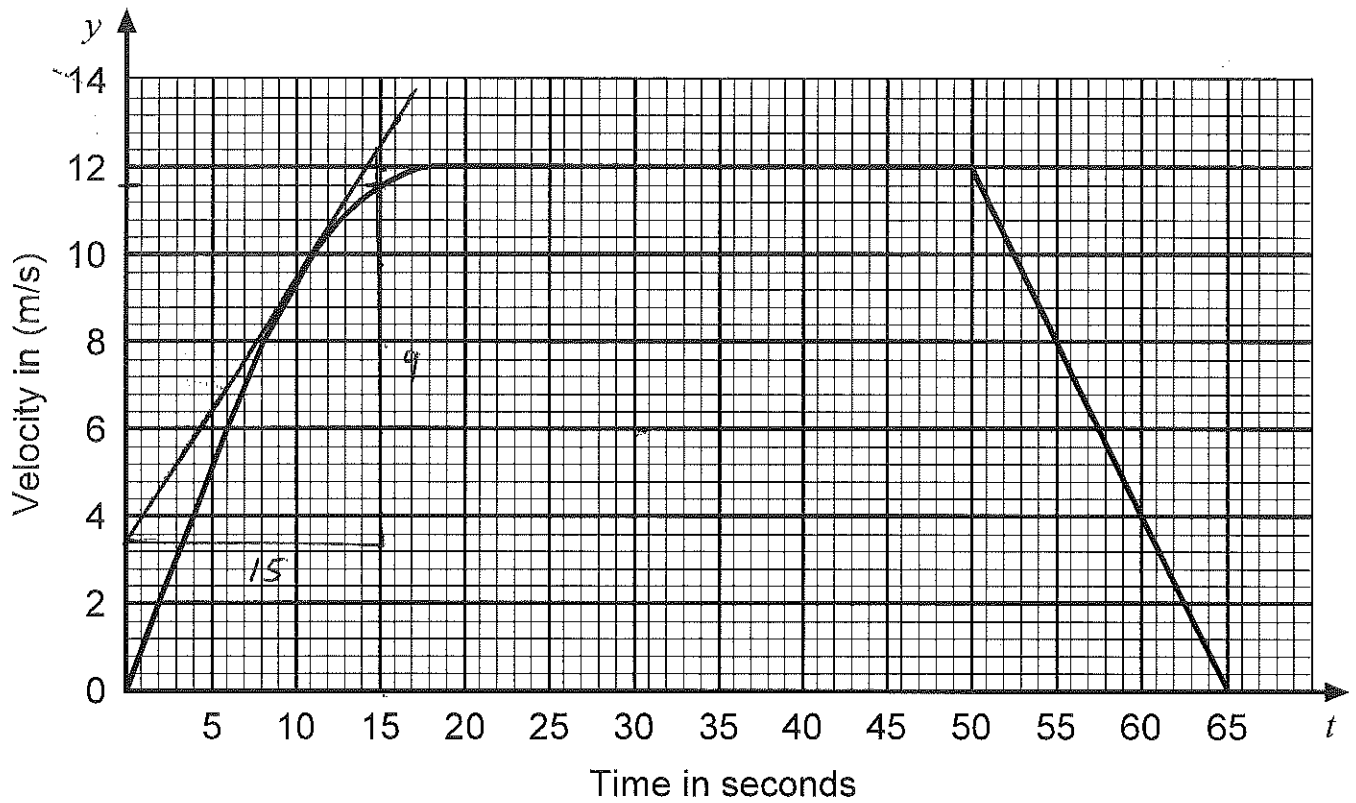
The car leaves the first set of traffic lights.

(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)

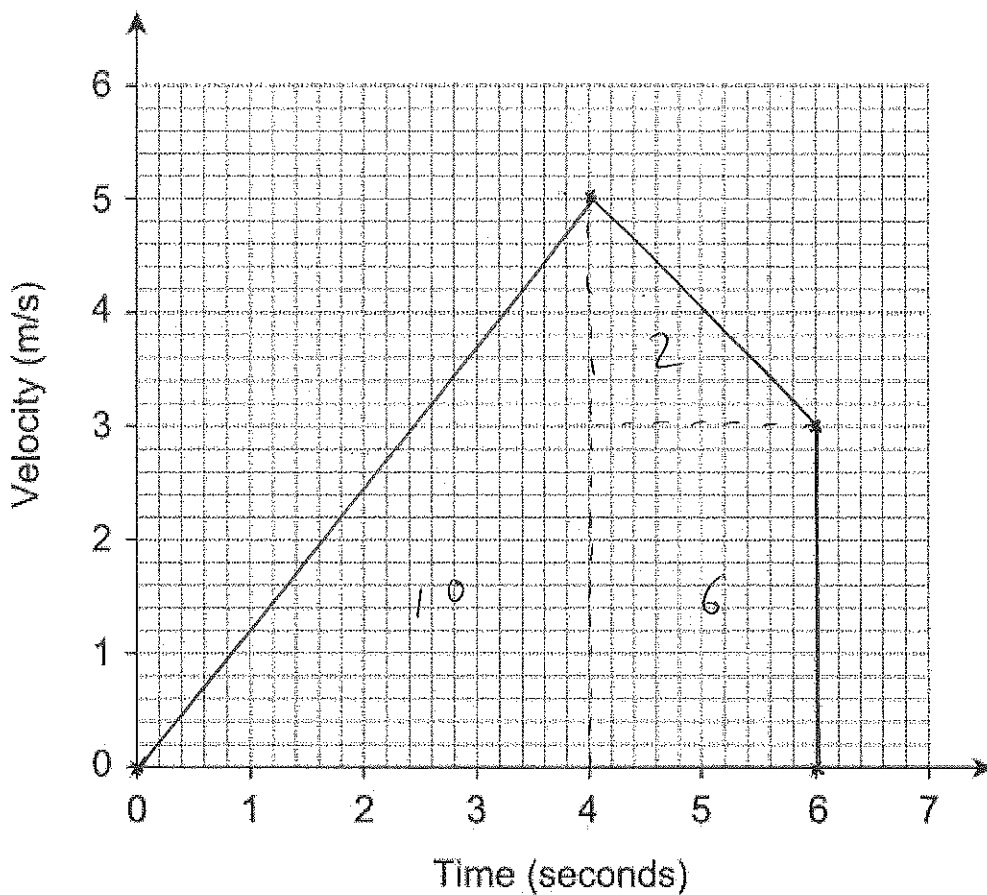2. A toy car is placed on the floor of a sports hall.

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.
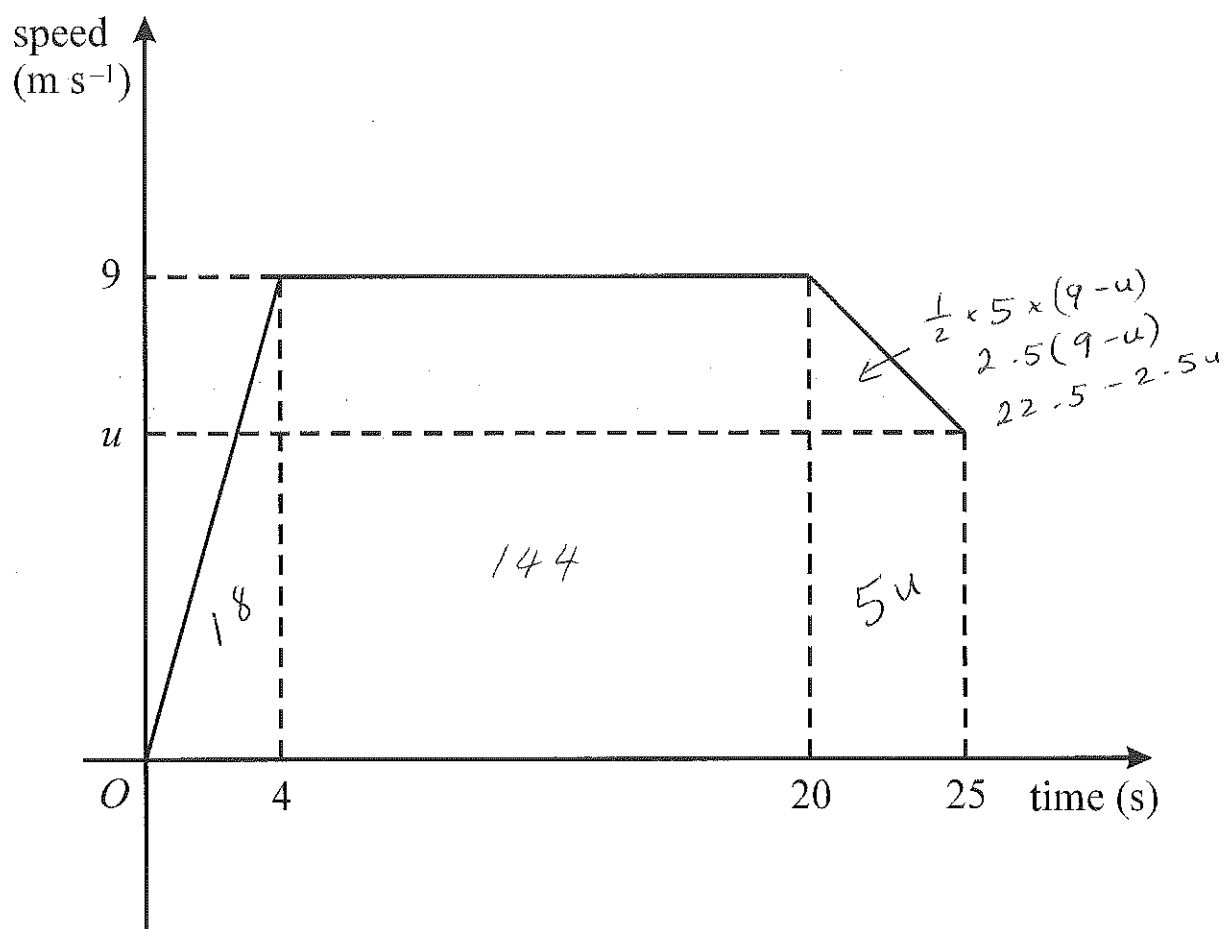It then hits a wall and stops.

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

Time (seconds)

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

$$\frac{9}{4}$$

..........$2.25m/s^2$ **(2)**

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

..........$162m$ **(2)**

c) The value of u

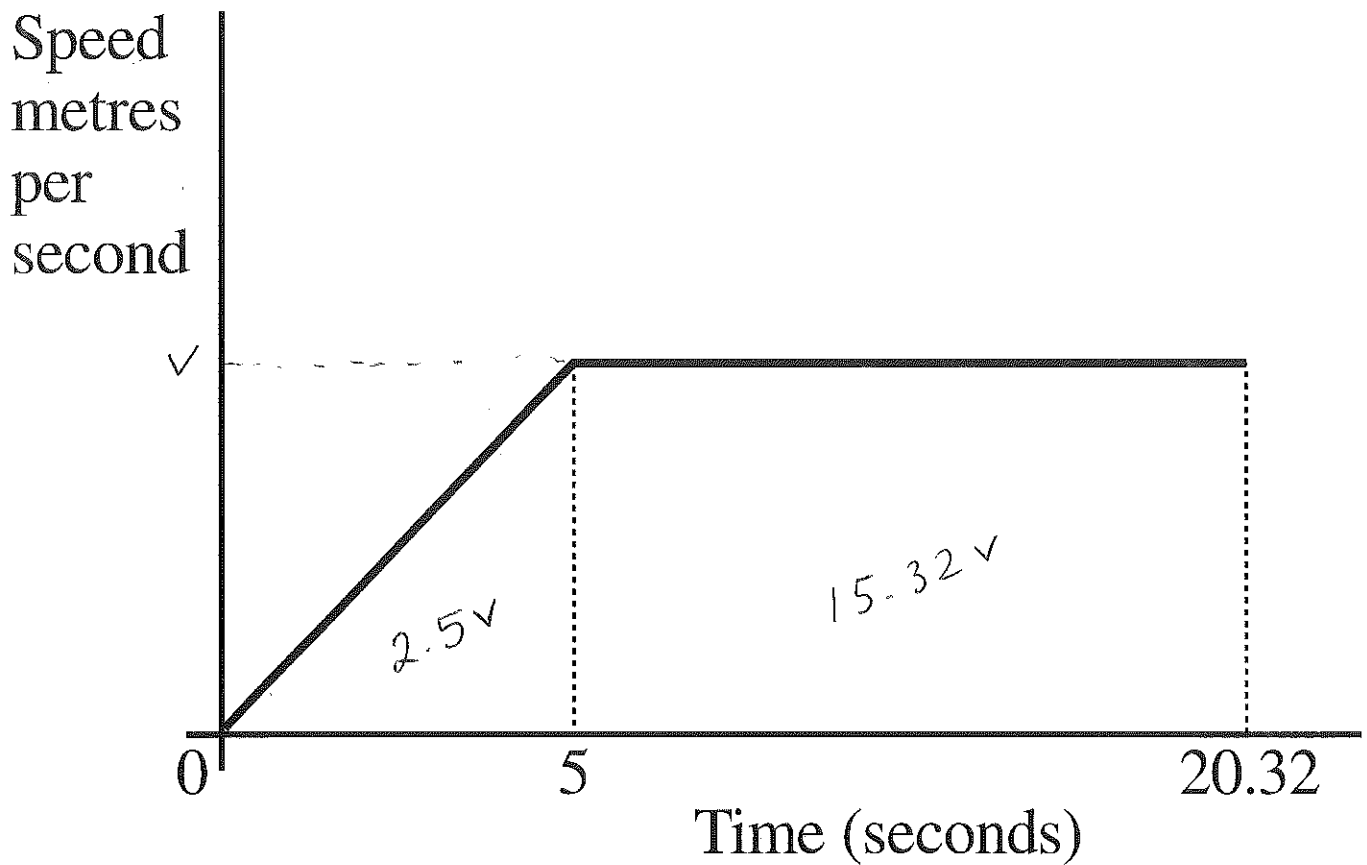$$22.5 - 2.5u + 5u = 38$$
$$2.5u + 22.5 = 38$$
$$2.5u = 15.5$$
$$u = \frac{15.5}{2.5}$$
$$= 6.2$$

..........$6.2m/s$ **(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.

Speed
metres
per
second

$\checkmark$

2.5$\checkmark$

15.32$\checkmark$

0

5

20.32

Time (seconds)

Calculate:

a) The maximum speed of the sprinter during the race

$17.82v = 200$

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

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

.... (4)

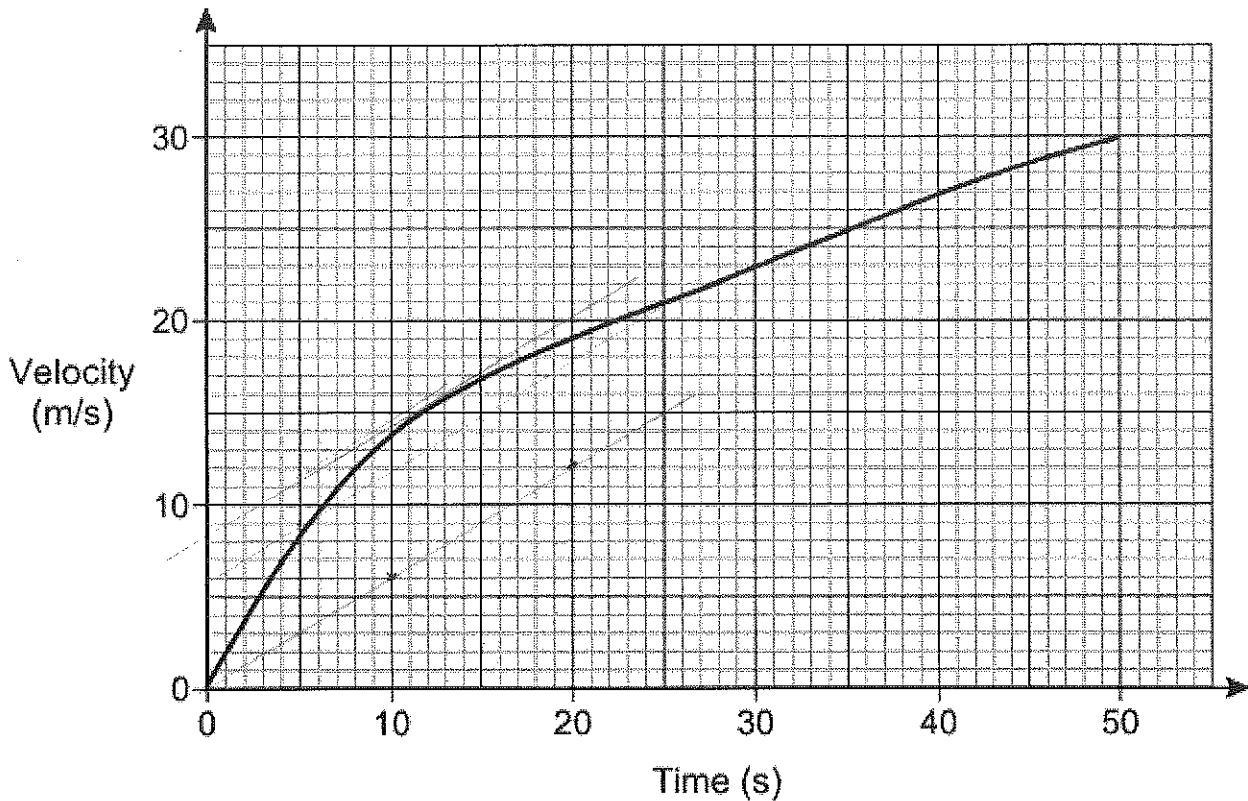b) The distance covered by the sprinter in the first 5 seconds of the race

2.5×11.22

28.06 m (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.

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

.... **(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)**