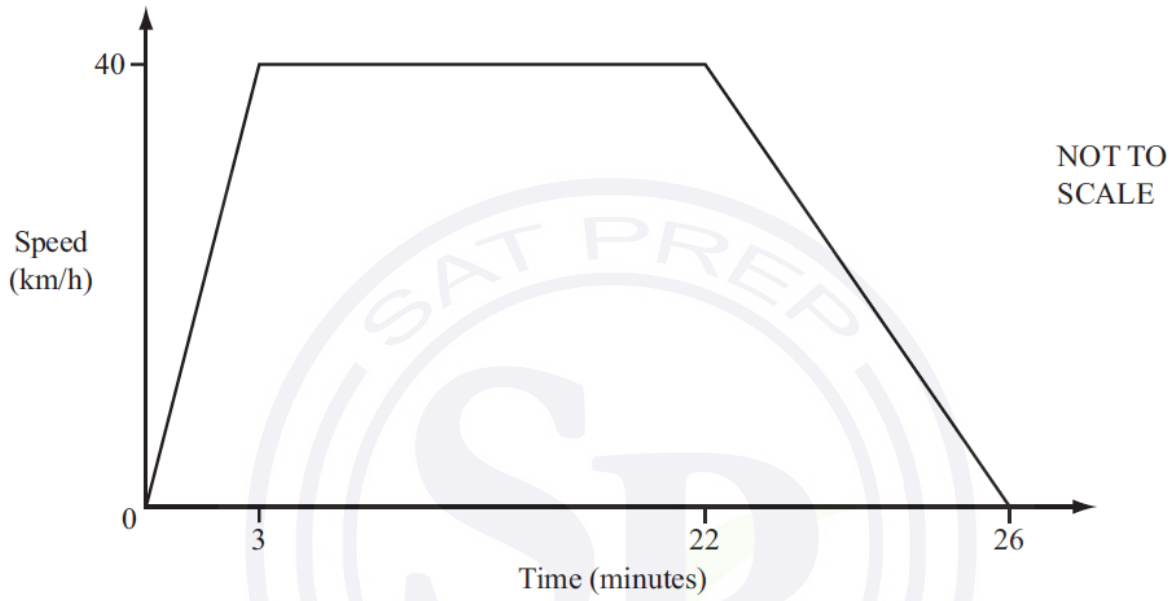
Extended Mathematics
Topic : Graph
Year :May 2013 -May 2024
Paper - 2
Questions Booklet

Question 1



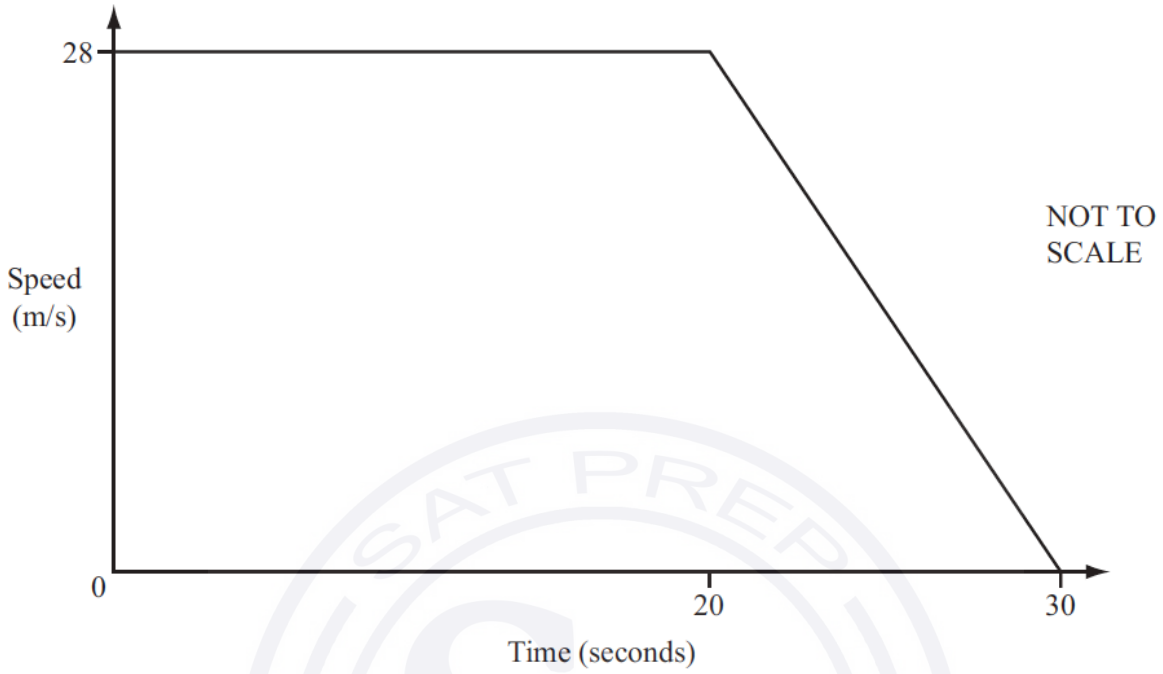
The diagram shows the speed-time graph of a train journey between two stations.

The train accelerates for 3 minutes, travels at a constant maximum speed of 40 km/h, then takes 4 minutes to slow to a stop.

Calculate the distance in kilometres between the two stations.

Answer ..... km [4]

Question 2



The diagram shows the speed-time graph of a car.
It travels at 28 m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.

(a) Calculate the deceleration of the car.

Answer(a) ..... m/s^2 [1]

(b) Calculate the distance travelled during the 30 seconds.

Answer(b) ..... m [3]

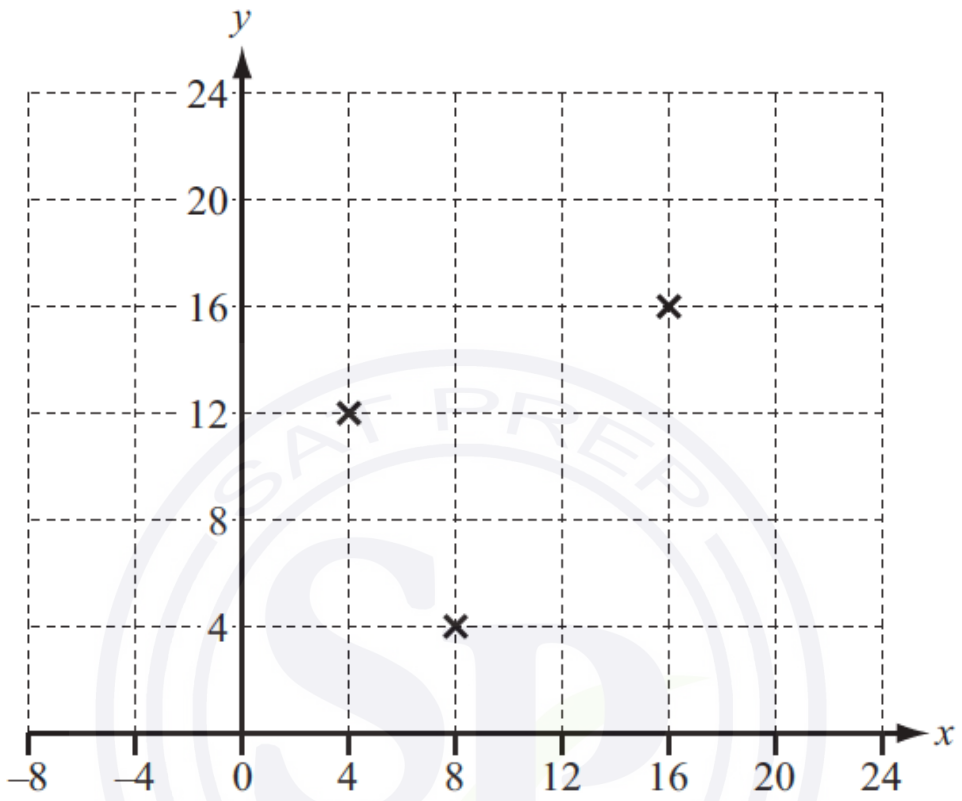
Question 3

Find the equation of the line passing through the points (0, –1) and (3, 5).

Answer ..... [3]

Question 4

Three of the vertices of a parallelogram are at (4, 12), (8, 4) and (16, 16).



Write down the co-ordinates of two possible positions of the fourth vertex.

Answer (..... , ...) and (..... , ...) [2]

Question 5

$A(5, 23)$ and $B(-2, 2)$ are two points.

(a) Find the co-ordinates of the midpoint of the line AB.

Answer(a) (..... , ...) [2]

(b) Find the equation of the line AB.

Answer(b) ..... [3]

(c) Show that the point (3, 17) lies on the line AB.

Answer(c)

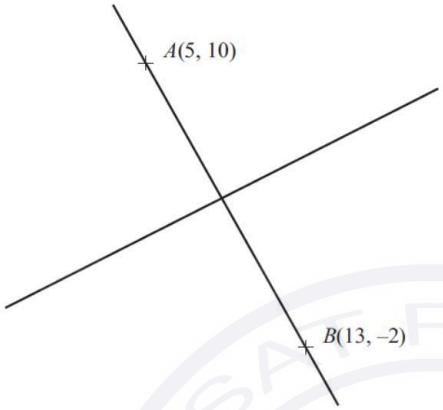
[1]

Question 6

Find the equation of the line passing through the points with co-ordinates (5, 9) and (–3, 13).

Answer ..... [3]

Question 7



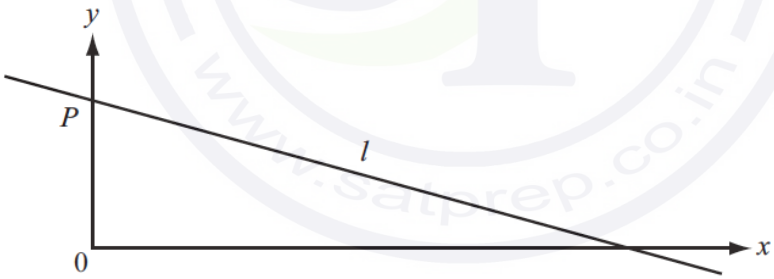
NOT TO SCALE

$A(5, 10)$ and $B(13, -2)$ are two points on the line AB.
The perpendicular bisector of the line AB has gradient $\frac{2}{3}$.

Find the equation of the perpendicular bisector of AB.

Answer ..... [4]

Question 8



NOT TO SCALE

The equation of the line l in the diagram is $y = 5 - x$.

(a) The line cuts the y-axis at P.

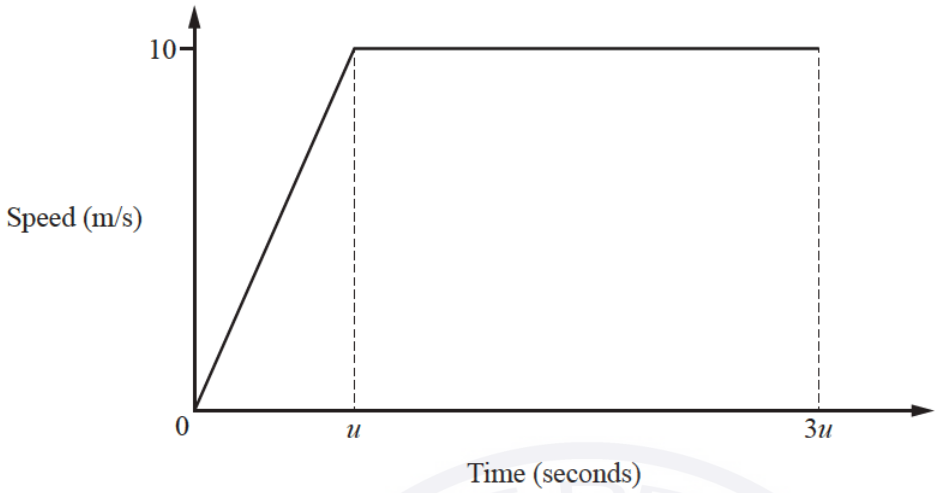
Write down the co-ordinates of P.

Answer(a) (..... , ...) [1]

(b) Write down the gradient of the line l.

Answer(b) ..... [1]

Question 9



NOT TO SCALE

A car starts from rest and accelerates for u seconds until it reaches a speed of 10 m/s.
The car then travels at 10 m/s for $2u$ seconds.
The diagram shows the speed-time graph for this journey.

The distance travelled by the car in the first $3u$ seconds is 125 m.

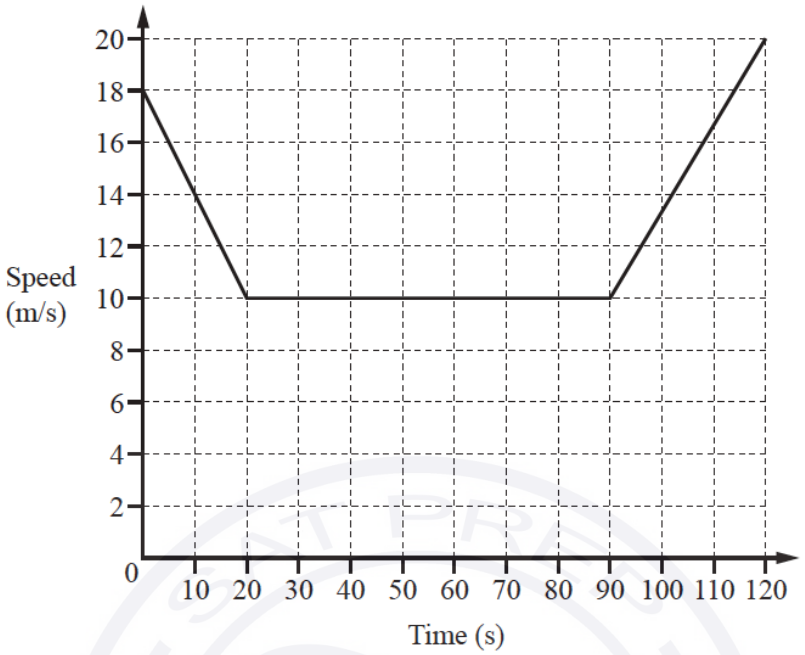
(a) Find the value of u.

Answer(a) $u =$ ..... [3]

(b) Find the acceleration in the first u seconds.

Answer(b) ..... m/s^2 [1]

Question 10



The diagram shows the speed-time graph for 120 seconds of a car journey.

(a) Calculate the deceleration of the car during the first 20 seconds.

Answer(a) ..... m/s^2 [1]

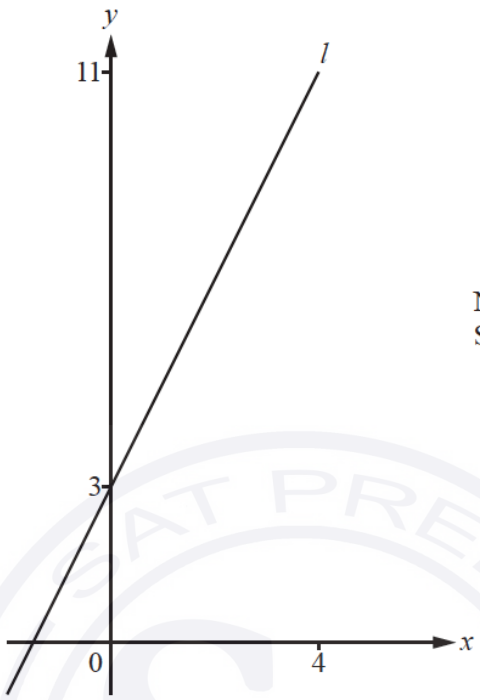
(b) Calculate the total distance travelled by the car during the 120 seconds.

Answer(b) ..... m [3]

(c) Calculate the average speed for this 120 second journey.

Answer(c) ..... m/s [1]

Question 11



NOT TO SCALE

The diagram shows the straight line, l, which passes through the points (0, 3) and (4, 11).

(a) Find the equation of line l in the form $y = mx + c$.

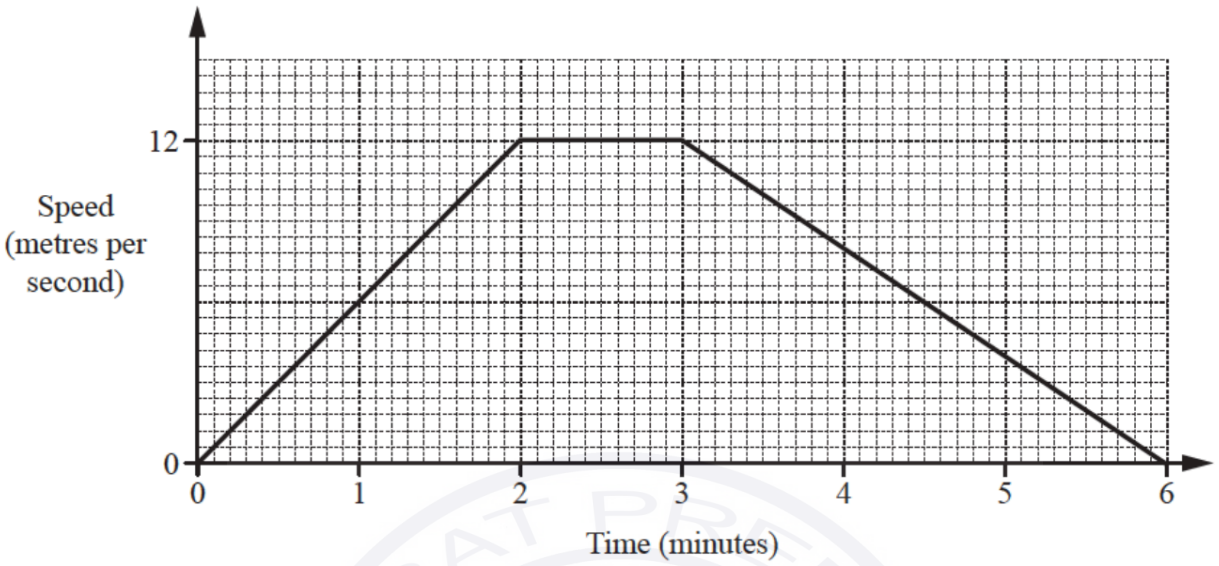
Answer(a) $y =$ ..... [3]

(b) Line p is perpendicular to line l.

Write down the gradient of line p.

Answer(b) ..... [1]

Question 12



A tram leaves a station and accelerates for 2 **minutes** until it reaches a speed of 12 metres per second.
It continues at this speed for 1 minute.
It then decelerates for 3 minutes until it stops at the next station.
The diagram shows the speed-time graph for this journey.

Calculate the distance, in metres, between the two stations.

Answer ..... m [3]

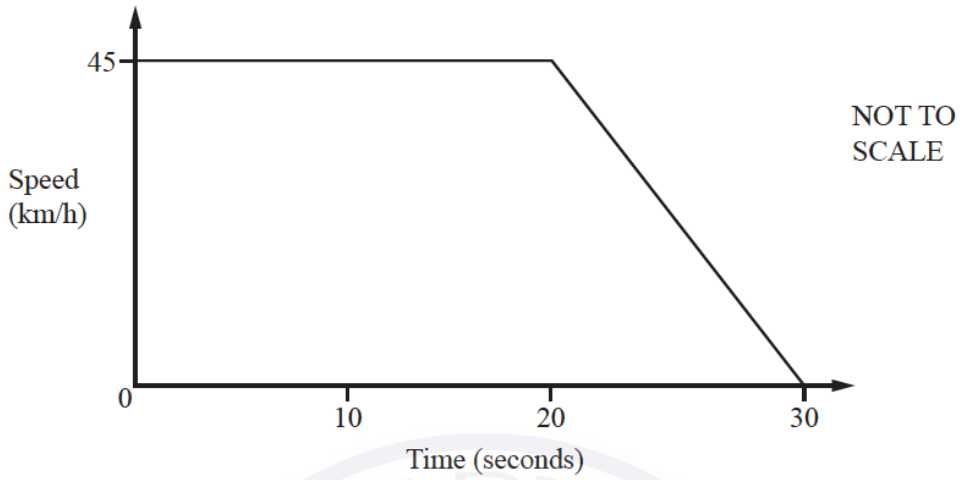
Question 13

The point A has co-ordinates $(-4, 6)$ and the point B has co-ordinates $(7, -2)$.

Calculate the length of the line AB.

Answer AB = ... units [3]

Question 14



The diagram shows the speed-time graph of a car.
The car travels at 45 km/h for 20 seconds.
The car then decelerates for 10 seconds until it stops.

(a) Change 45 km/h into m/s.

Answer(a) ..... m/s [2]

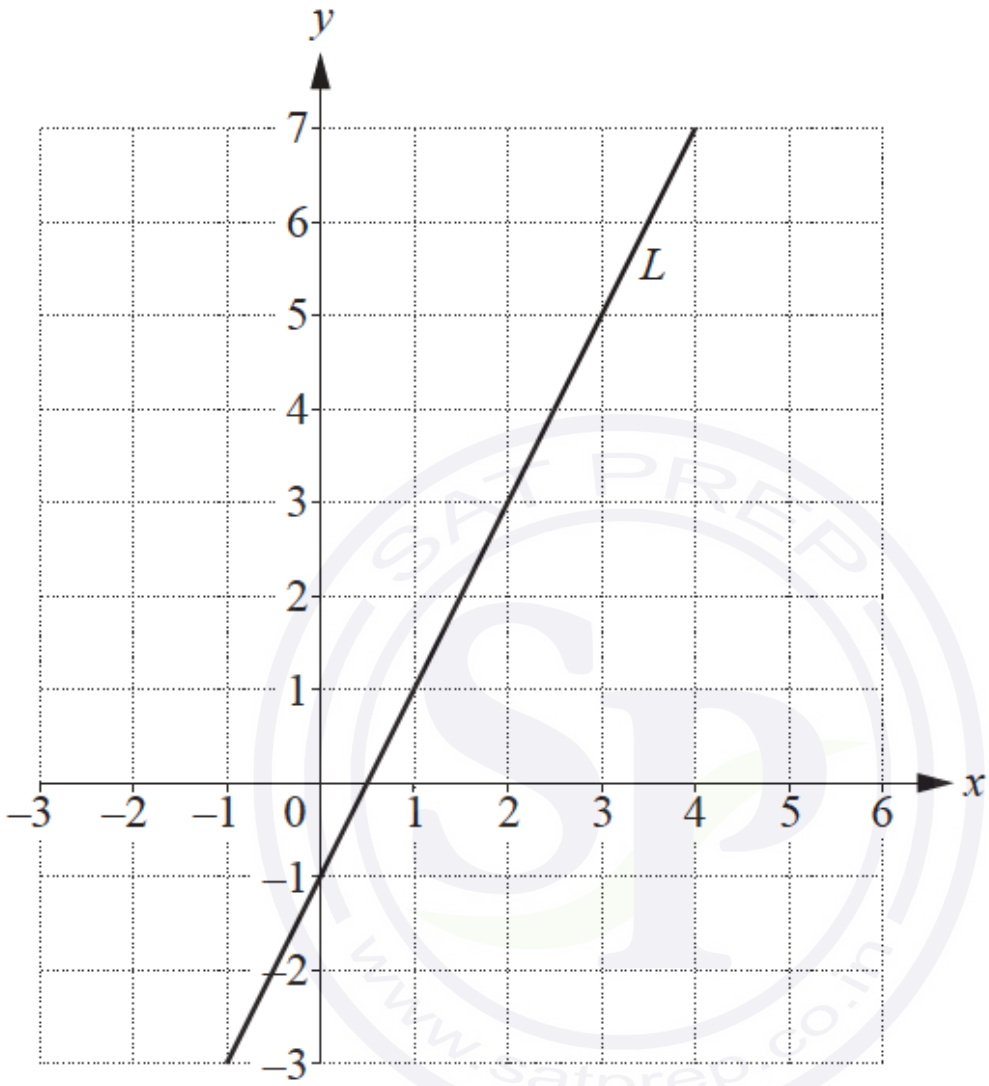
(b) Find the deceleration of the car, giving your answer in m/s^2.

Answer(b) ..... m/s^2 [1]

(c) Find the distance travelled by the car during the 30 seconds, giving your answer in metres.

Answer(c) ..... m [3]

Question 15



(a) Work out the gradient of the line L.

..... [2]

(b) Write down the equation of the line parallel to the line L that passes through the point (0, 6).

..... [2]

Question 16

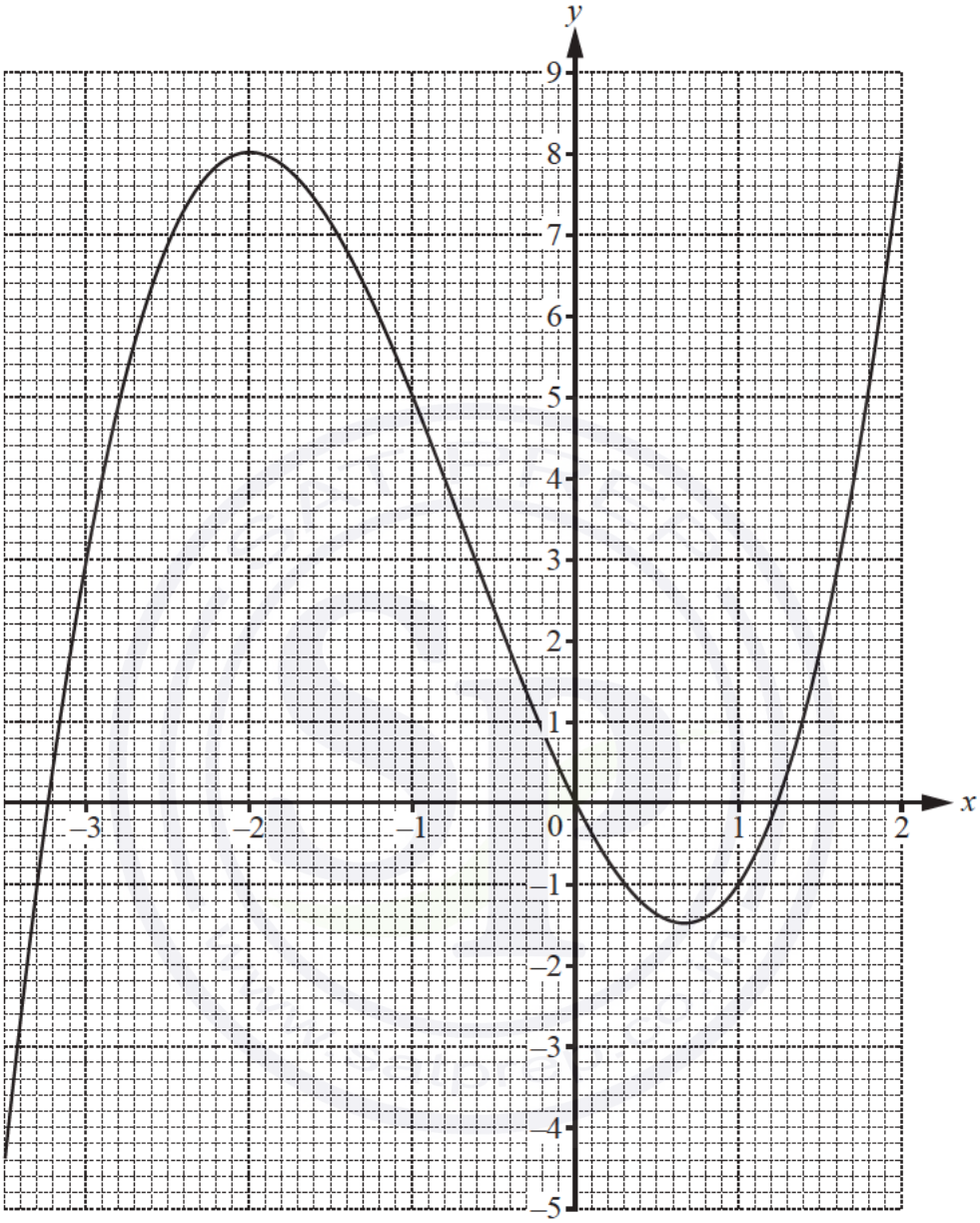
A is the point (4, 1) and B is the point (10, 15).

Find the equation of the perpendicular bisector of the line AB.

..... [6]

Question 17

The curve $y = x^3 + 2x^2 - 4x$ is shown on the grid.



(a) By drawing a suitable tangent, find an estimate of the gradient of the curve when $x = 1$.

..... [3]

(b) A point D lies on the curve.
The x co-ordinate of D is negative.
The gradient of the tangent at D is 0.

Write down the co-ordinates of D.

(..... , ...) [1]

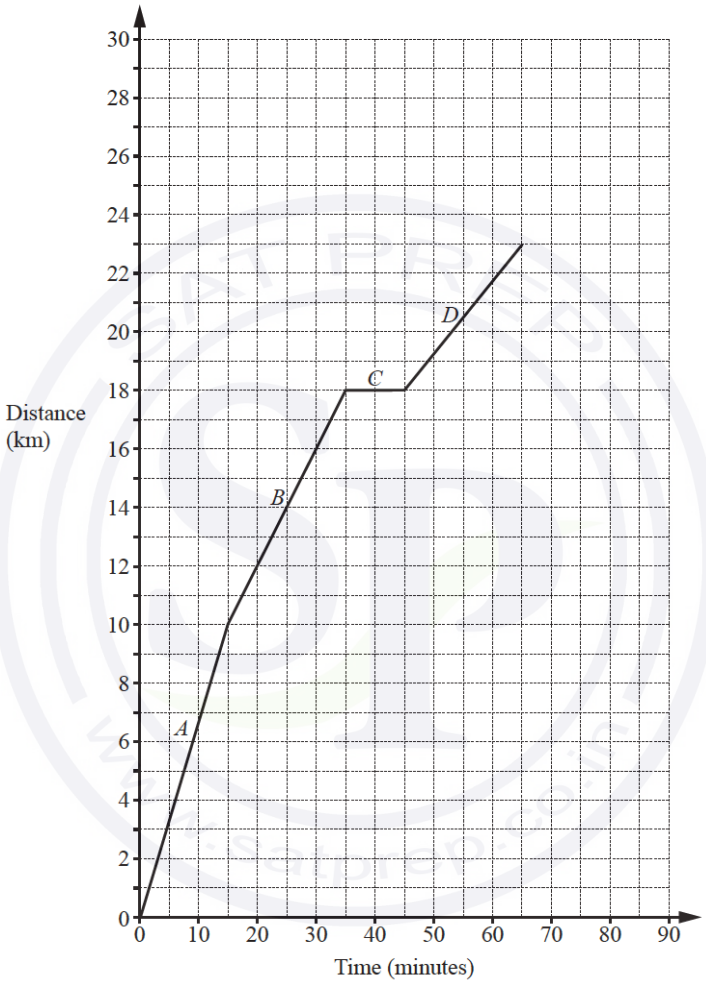
Question 18

A is the point (8, 3) and B is the point (12, 1).

Find the equation of the line, perpendicular to the line AB, which passes through the point (0, 0).

..... [3]

Question 19



The diagram shows the distance-time graph for the first 65 minutes of a bicycle journey.

(a) There are four different parts to the journey labelled A, B, C and D.

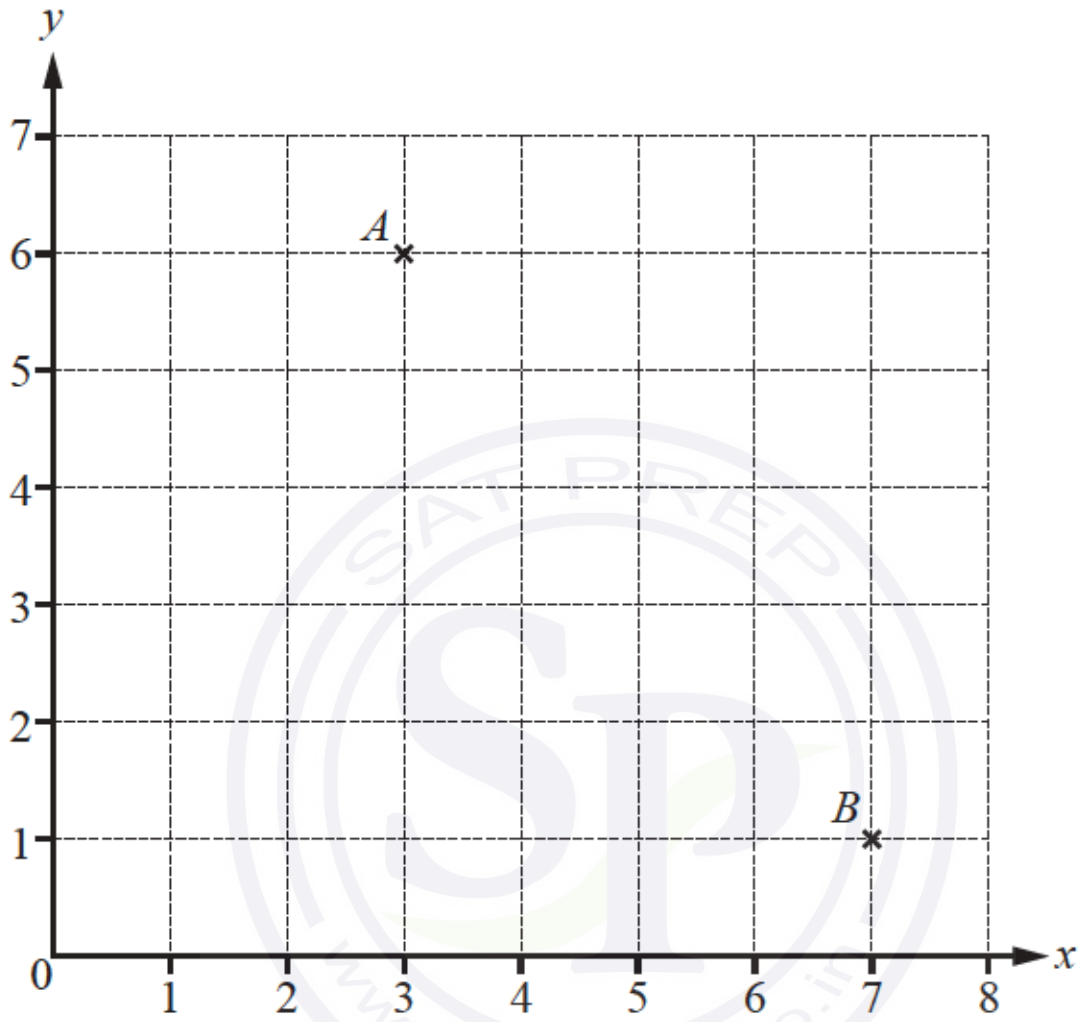
Write down the part of the journey with the fastest speed.

..... [1]

(b) After the first 65 minutes the bicycle travels at a constant speed of 20 km/h for 15 minutes.

Draw this part of the journey on the diagram. [1]

Question 20



Point A has co-ordinates (3, 6).

(a) Write down the co-ordinates of point B.

(..... , ...) [1]

(b) Find the gradient of the line AB.

..... [2]

(c) Find the equation of the line that

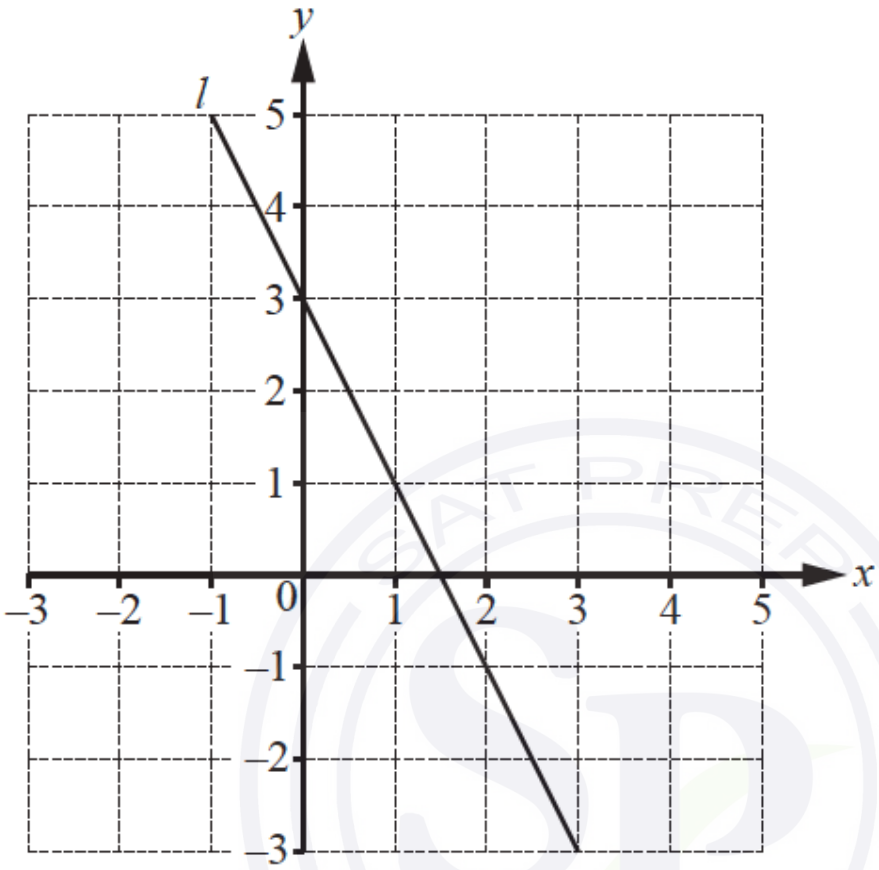
- is perpendicular to the line AB

and

- passes through the point (0, 2).

..... [3]

Question 21



(a) Find the equation of the line l.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

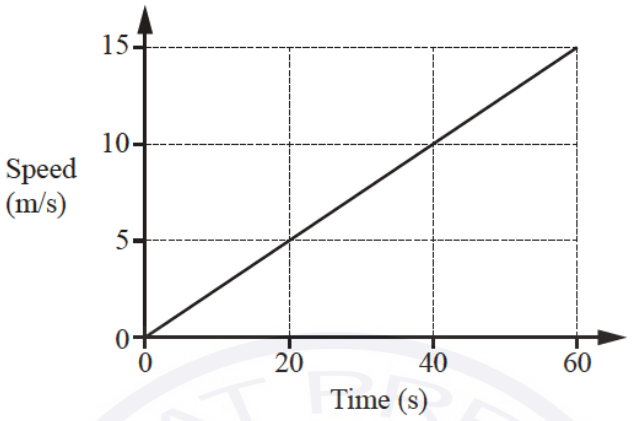
(b) A line perpendicular to the line l passes through the point $(3, -1)$.

Find the equation of this line.

..... [3]

Question 22

The speed-time graph shows the first 60 seconds of a train journey.



(a) Find the acceleration of the train.

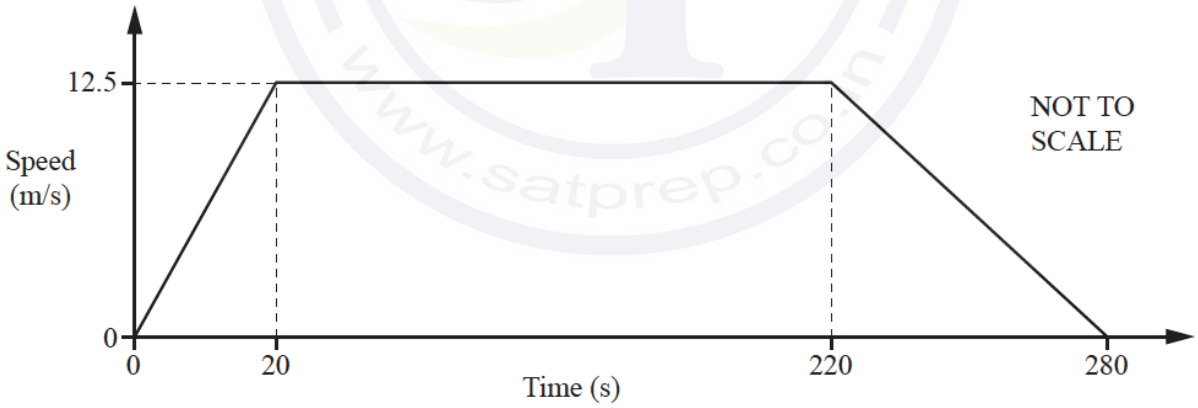
..... m/s^2 [1]

(b) Calculate the distance the train has travelled in this time.
Give your answer in kilometres.

..... km [3]

Question 23

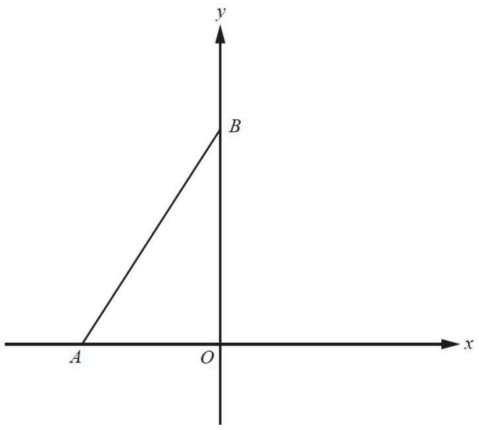
The diagram shows a speed-time graph for the journey of a car.



Calculate the total distance travelled.

..... m [3]

Question 24



NOT TO SCALE

A is the point $(-2, 0)$ and B is the point $(0, 4)$.

(a) Find the equation of the straight line joining A and B.

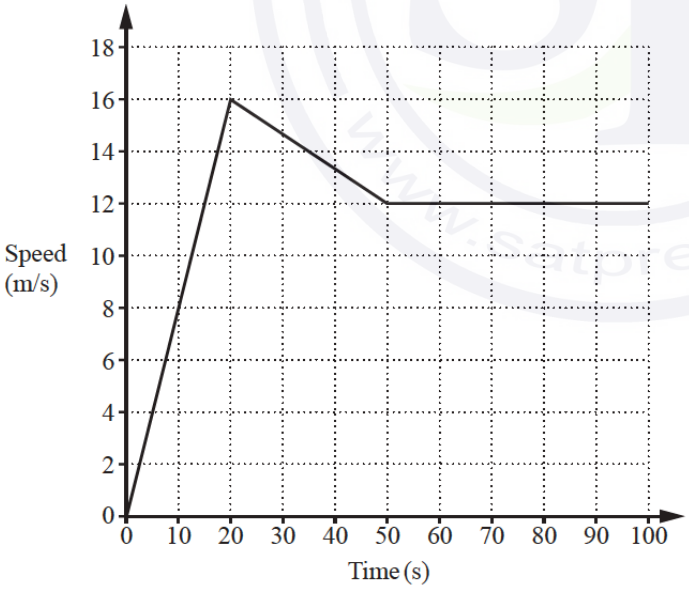
..... [3]

(b) Find the equation of the perpendicular bisector of AB.

..... [4]

Question 25

The diagram shows information about the first 100 seconds of a car journey.



(a) Calculate the acceleration during the first 20 seconds of the journey.

..... m/s^2 [1]

(b) Work out the total distance travelled by the car in the 100 seconds.

..... m [3]

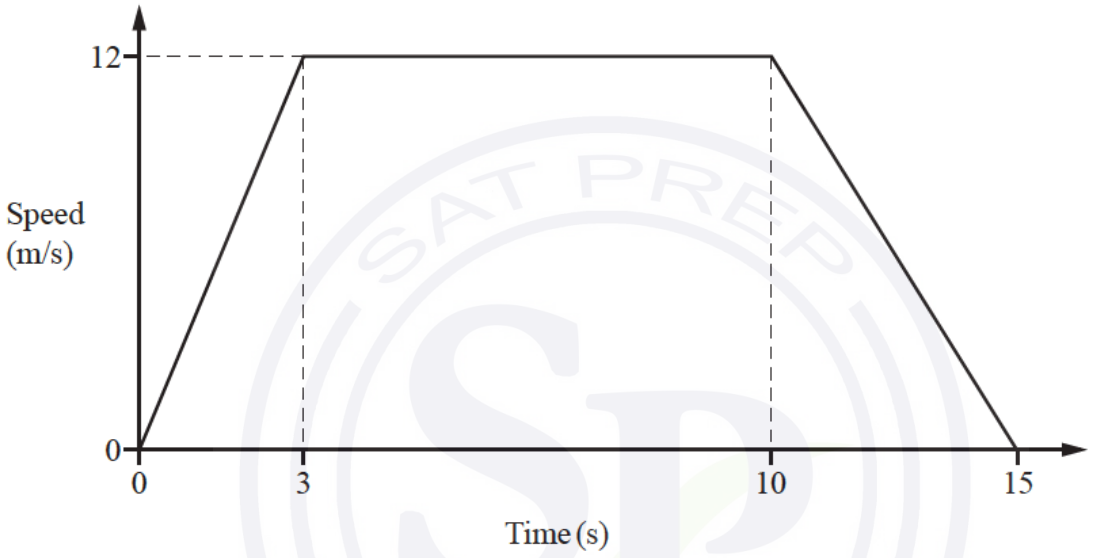
Question 26

A line has gradient 5.
M and N are two points on this line.
M is the point $(x, 8)$ and N is the point $(k, 23)$.

Find an expression for x in terms of k.

$x =$ ..... [3]

Question 27



NOT TO SCALE

The diagram shows a speed-time graph.

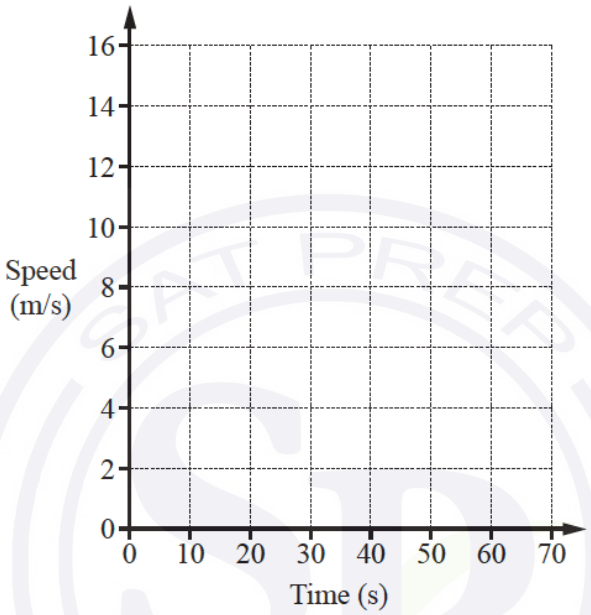
Calculate the total distance travelled.

..... m [3]

Question 28

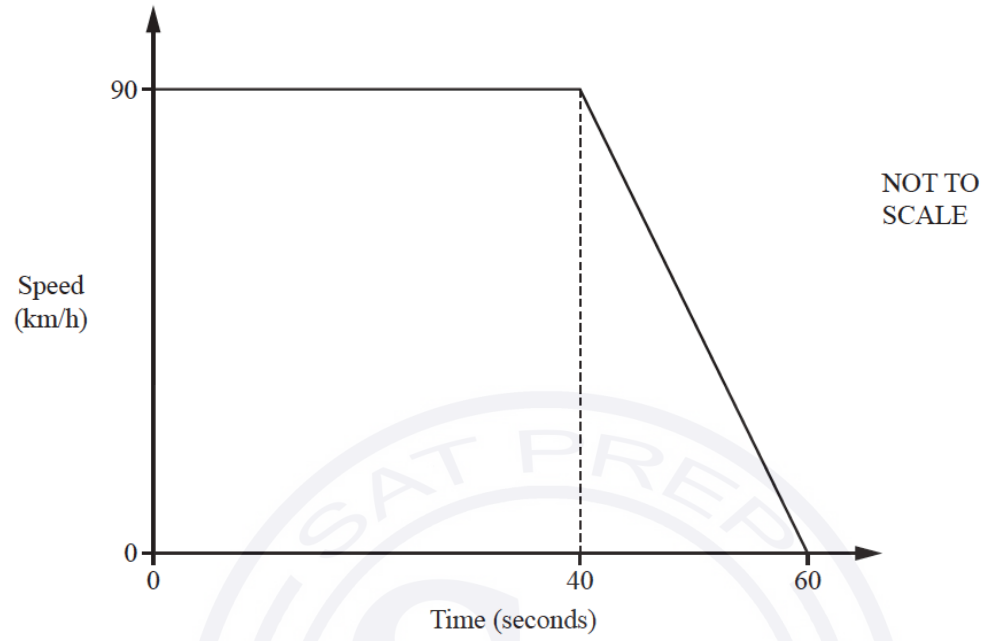
Petra begins a journey in her car.
She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds.
She then travels at a constant speed for 40 seconds.

On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



[2]

Question 29



The diagram shows the speed–time graph for 60 seconds of a car journey.

(a) Change 90 km/h to m/s.

..... m/s [2]

(b) Find the deceleration of the car in m/s^2.

..... m/s^2 [1]

(c) Find the distance travelled, in metres, in the 60 seconds.

..... m [2]

Question 30

P is the point (16, 9) and Q is the point (22, 24).

(a) Find the equation of the line perpendicular to PQ that passes through the point (5, 1).
Give your answer in the form $y = mx + c$.

$y =$ ..... [4]

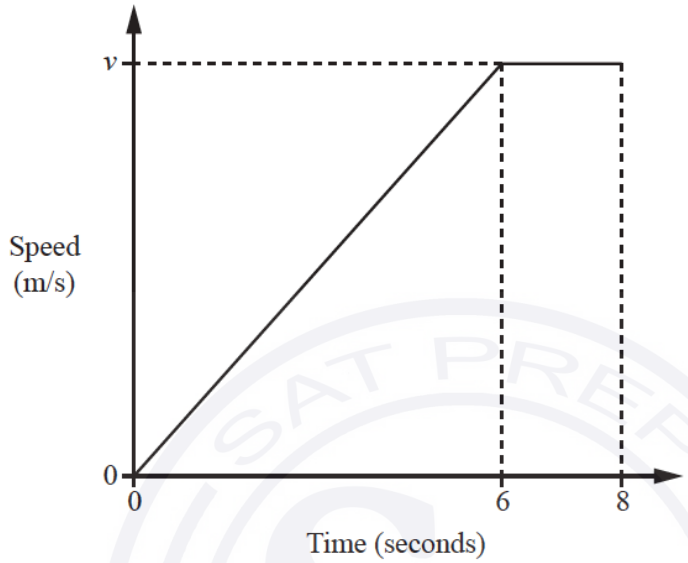
(b) N is the point on PQ such that $PN = 2NQ$.

Find the co-ordinates of N.

(..... , ...) [2]

Question 31

The diagram shows information about the first 8 seconds of a car journey.



NOT TO SCALE

The car travels with constant acceleration reaching a speed of v m/s after 6 seconds.
The car then travels at a constant speed of v m/s for a further 2 seconds.
The car travels a total distance of 150 metres.

Work out the value of v.

$v =$ ..... [3]

Question 32

(a) Point A has co-ordinates (1, 0) and point B has co-ordinates (2, 5).

Calculate the angle between the line AB and the x-axis.

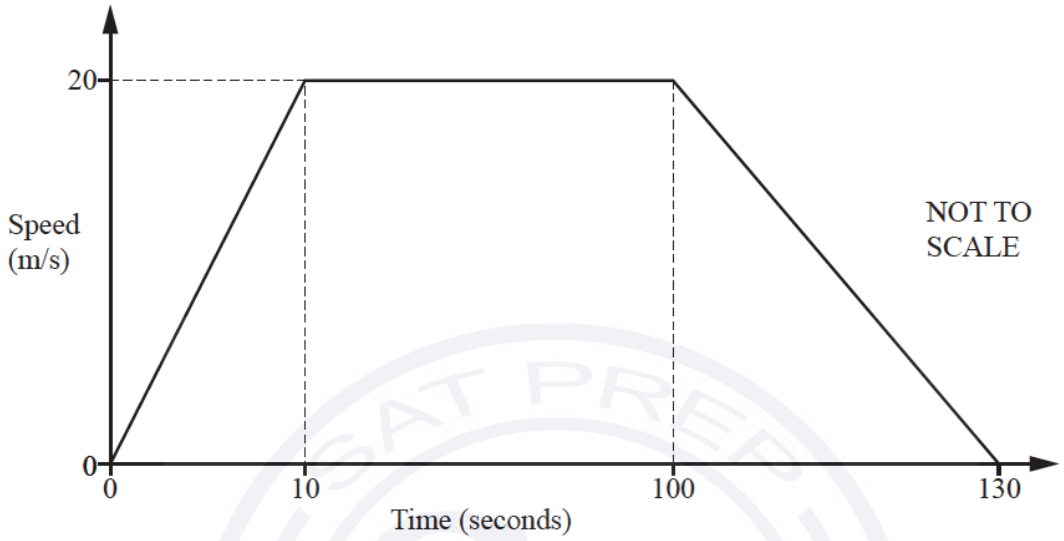
..... [3]

(b) The line PQ has equation $y = 3x - 8$ and point P has co-ordinates (6, 10).

Find the equation of the line that passes through P and is perpendicular to PQ.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

Question 33



The speed–time graph shows information about the journey of a tram between two stations.

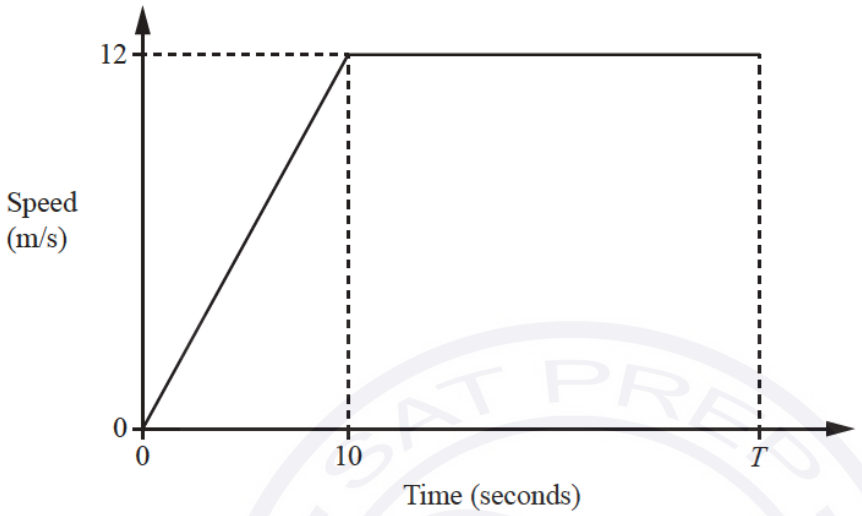
(a) Calculate the distance between the two stations.

..... m [3]

(b) Calculate the average speed of the tram for the whole journey.

..... m/s [1]

Question 34



NOT TO SCALE

The diagram shows the speed–time graph for the first T seconds of a car journey.

(a) Find the acceleration during the first 10 seconds.

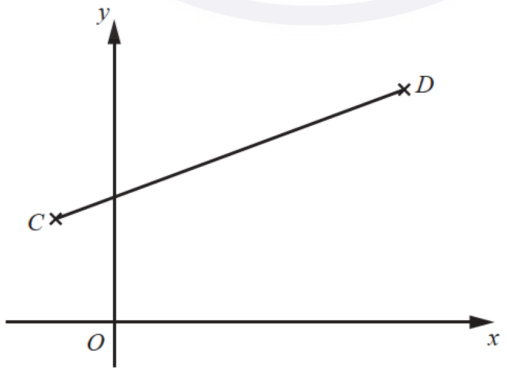
..... m/s^2 [1]

(b) The total distance travelled during the T seconds is 480 m.

Find the value of T.

$T =$ ..... [3]

Question 35



NOT TO SCALE

The diagram shows the points $C(-1, 2)$ and $D(9, 7)$.

Find the equation of the line perpendicular to CD that passes through the point $(1, 3)$.
Give your answer in the form $y = mx + c$.

$y =$ ..... [4]

Question 36

Find the mid-point of AB where $A = (w, r)$ and $B = (3w, t)$.
Give your answer in its simplest form in terms of w, r and t.

(..... , ...) [2]

Question 37

A is the point $(2, 3)$ and B is the point $(7, -5)$.

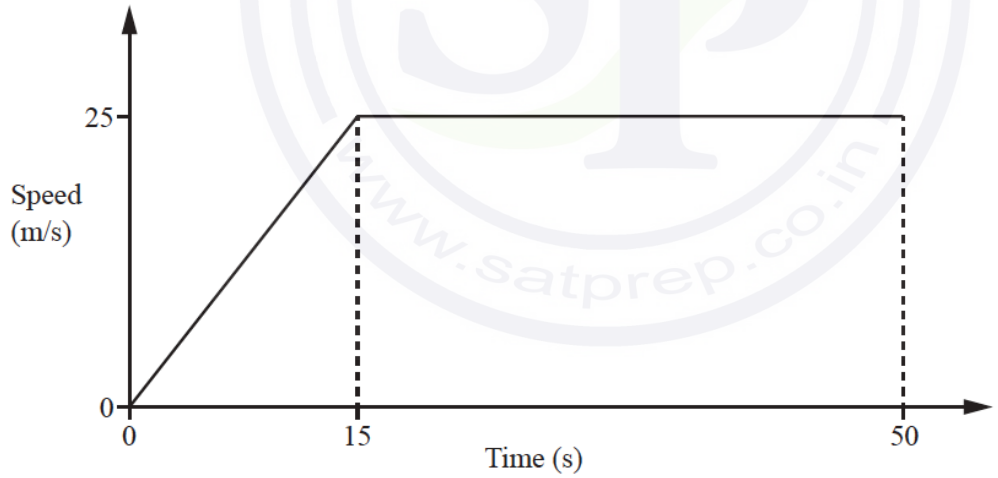
(a) Find the co-ordinates of the midpoint of AB.

(..... , ...) [2]

(b) Find the equation of the line through A that is perpendicular to AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [4]

Question 38



NOT TO
SCALE

The speed–time graph shows the first 50 seconds of a journey.

Calculate

(a) the acceleration during the first 15 seconds,

..... m/s^2 [1]

(b) the distance travelled in the 50 seconds.

..... m [3]

Question 39

A is the point $(7, 12)$ and B is the point $(2, -1)$.

Find the length of AB.

..... [3]

(a) Find the co-ordinates of the point where the line $y = 3x - 8$ crosses the y-axis.

(..... , ...) [1]

(b) Write down the gradient of the line $y = 3x - 8$.

..... [1]

Question 40

Line L passes through the points $(0, -3)$ and $(6, 9)$.

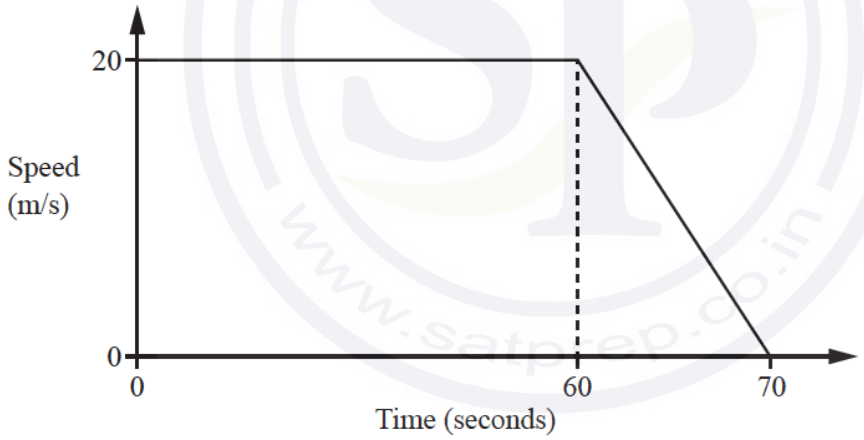
(a) Find the equation of line L.

..... [3]

(b) Find the equation of the line that is perpendicular to line L and passes through the point $(0, 2)$.

..... [2]

Question 41



NOT TO SCALE

The diagram shows information about the final 70 seconds of a car journey.

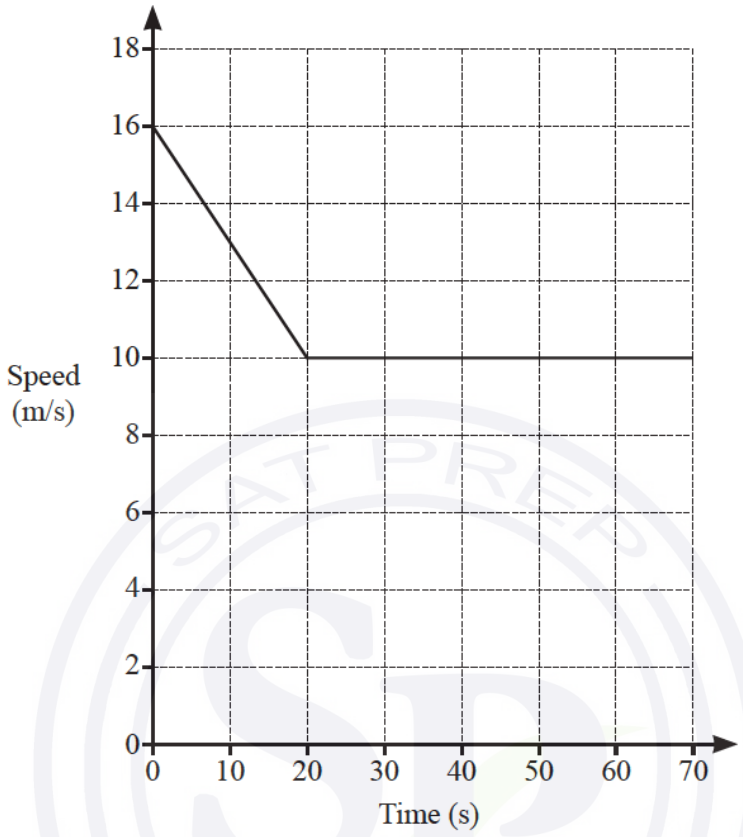
(a) Find the deceleration of the car between 60 and 70 seconds.

..... m/s^2 [1]

(b) Find the distance travelled by the car during the 70 seconds.

..... m [3]

Question 42



The diagram shows the speed–time graph for 70 seconds of a car journey.

(a) Calculate the deceleration of the car during the first 20 seconds.

..... m/s^2 [1]

(b) Calculate the total distance travelled by the car during the 70 seconds.

..... m [3]

Question 43

A straight line joins the points $(3k, 6)$ and $(k, -5)$.
The line has a gradient of 2.

Find the value of k.

$k =$ ..... [3]

Question 44

A is the point (2, 1) and B is the point (9, 4).

Find the length of AB.

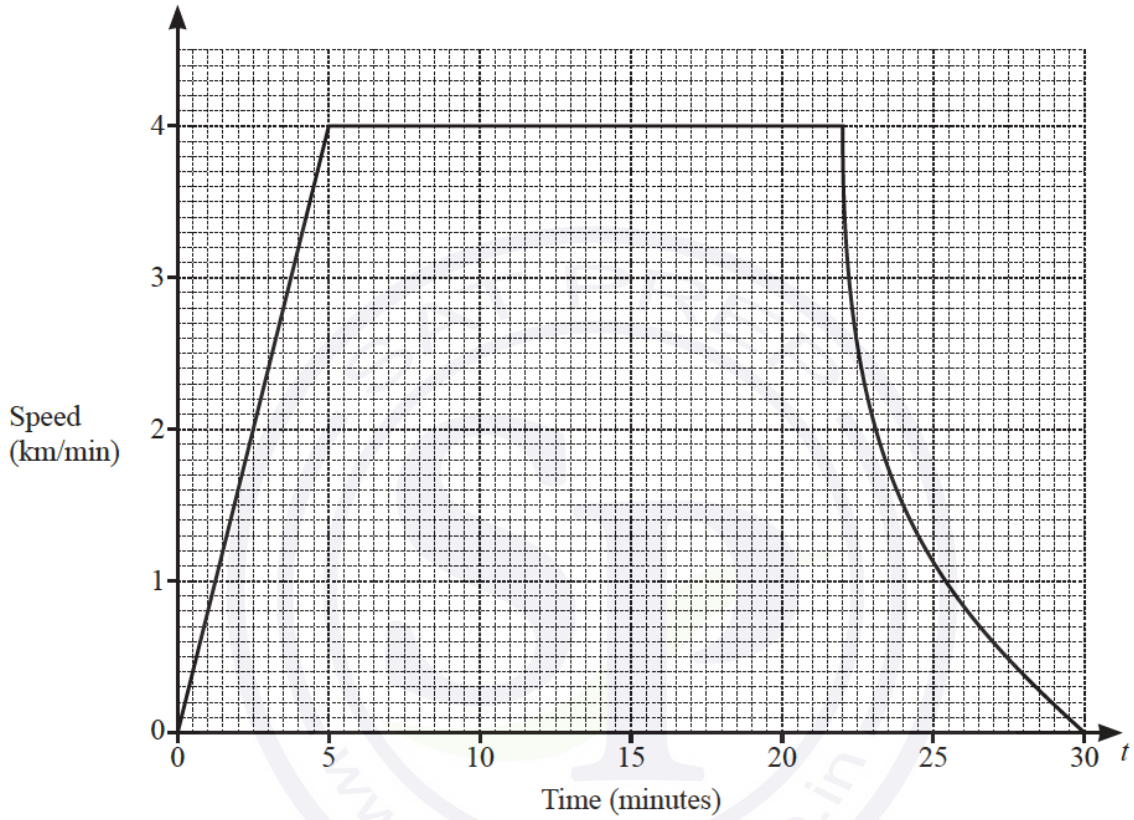
..... [3]

Question 45

Find the gradient of the line that is perpendicular to the line $2y = 3 + 5x$.

..... [2]

Question 46



The speed–time graph shows information about a train journey.

(a) By drawing a suitable tangent to the graph, estimate the gradient of the curve at $t = 24$.

..... [3]

(b) What does this gradient represent?

..... [1]

(c) Work out the distance travelled by the train when it is travelling at constant speed.

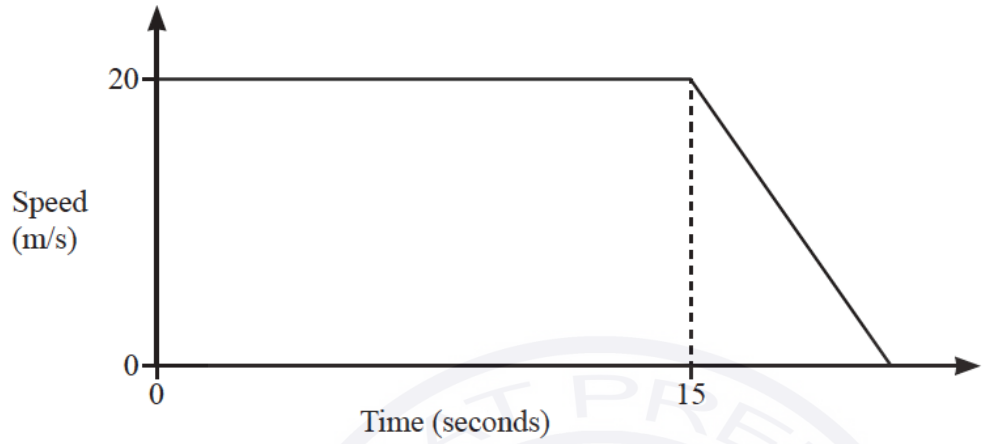
..... km [2]

Question 47

Show that the line $4y = 5x - 10$ is perpendicular to the line $5y + 4x = 35$.

[3]

Question 48



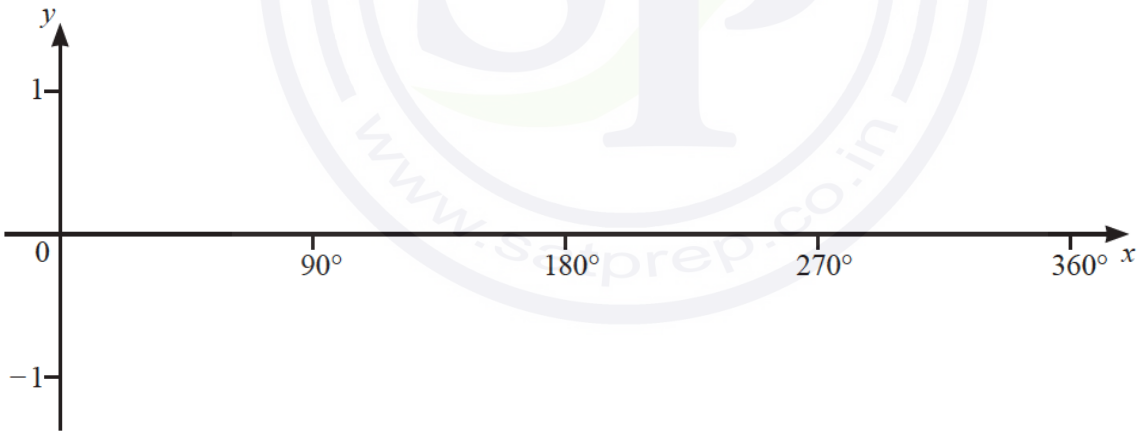
NOT TO SCALE

A car travels at 20 m/s for 15 seconds before it comes to rest by decelerating at 2.5 m/s^2.

Find the total distance travelled.

..... m [5]

Question 49



(a) On the diagram, sketch the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$. [2]

(b) Solve the equation $4\cos x + 2 = 3$ for $0° \leqslant x \leqslant 360°$.

$x =$ ..... and $x =$ ..... [3]

Question 50

A is the point $(3, 5)$ and B is the point $(1, -7)$.

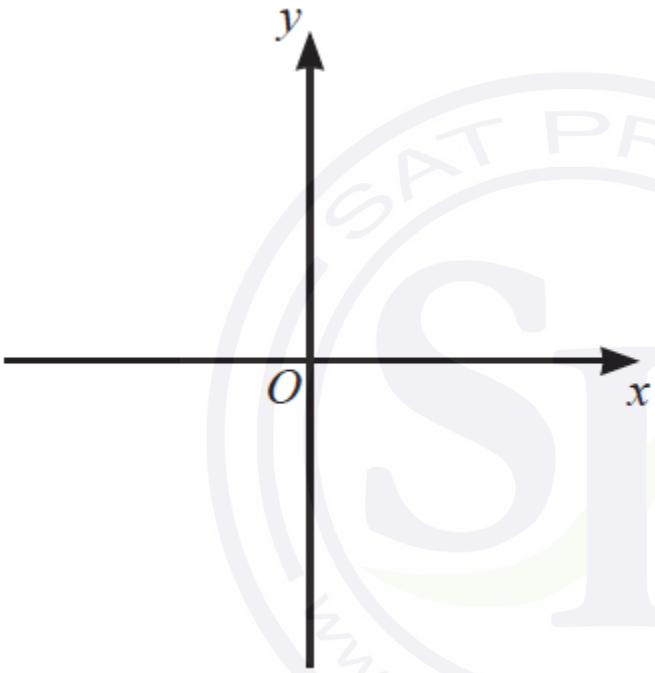
Find the equation of the line perpendicular to AB that passes through the point A.
Give your answer in the form $y = mx + c$.

$y =$ ..... [4]

Question 51

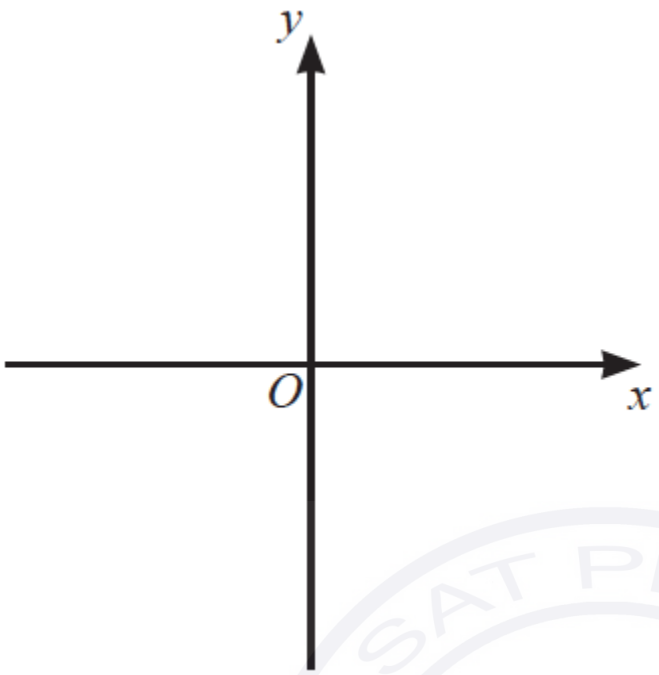
Sketch the graph of each function.

(a) $y = x - 3$



[1]

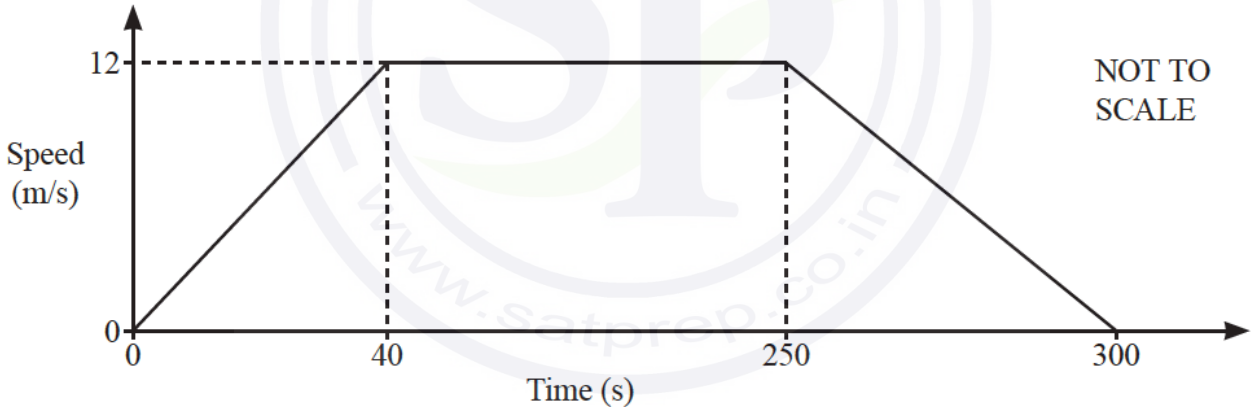
(b) $y = \frac{1}{x}$



[2]

Question 52

The diagram shows the speed–time graph of a train journey between two stations.



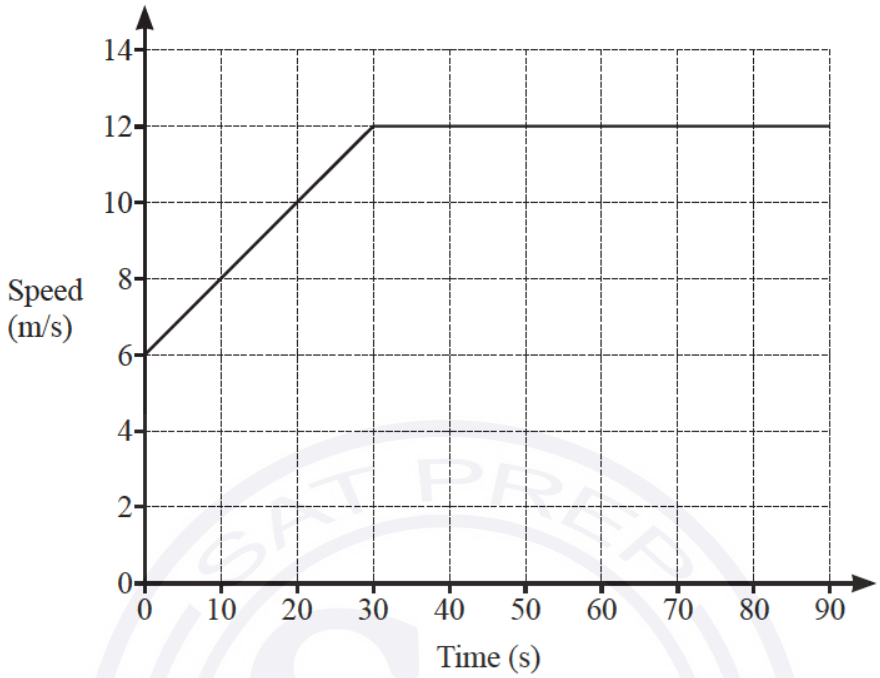
(a) Find the acceleration of the train during the first 40 seconds.

..... m/s^2 [1]

(b) Calculate the distance between the two stations.

..... m [3]

Question 53

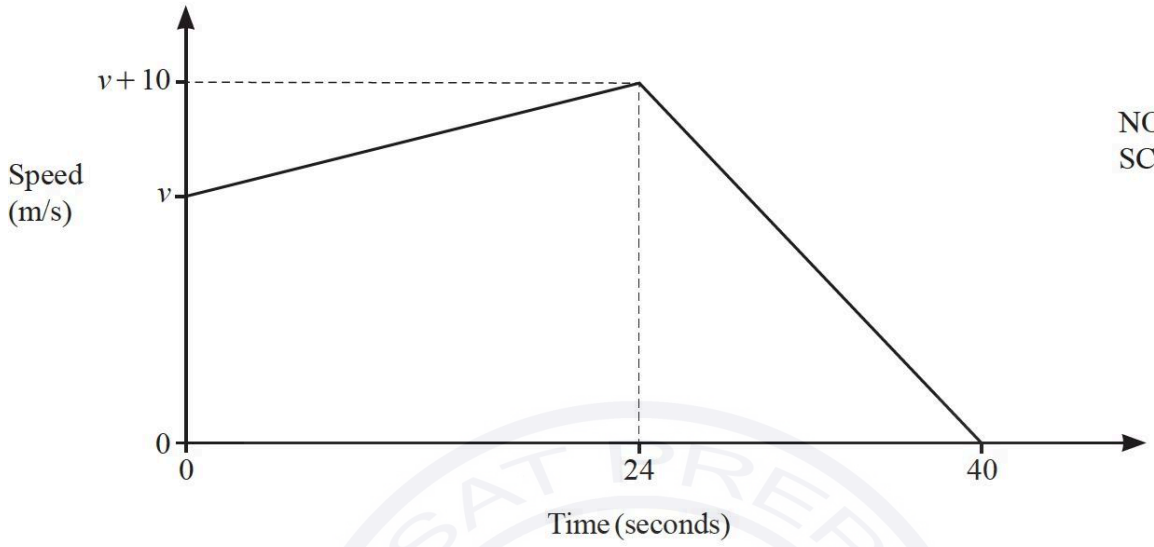


The diagram shows the speed–time graph for 90 seconds of a journey.

Calculate the total distance travelled during the 90 seconds.

..... m [3]

Question 54



The diagram shows the speed–time graph for the final 40 seconds of a car journey.
At the start of the 40 seconds the speed is v m/s.

(a) Find the acceleration of the car during the first 24 seconds.

..... m/s^2 [1]

(b) The total distance travelled during the 40 seconds is 1.24 **kilometres**.

Find the value of v.

$v =$ ..... [4]

Question 55

A straight line, l, has equation $y = 5x + 12$.

(a) Write down the gradient of line l.

..... [1]

(b) Find the coordinates of the point where line l crosses the x-axis.

(..... , ...) [2]

(c) A line perpendicular to line l has gradient k.

Find the value of k.

$k =$ ..... [1]

Question 56

A line from the point (2, 3) is perpendicular to the line $y = \frac{1}{3}x + 1$.
The two lines meet at the point P.

Find the coordinates of P.

(..... , ...) [5]

Question 57

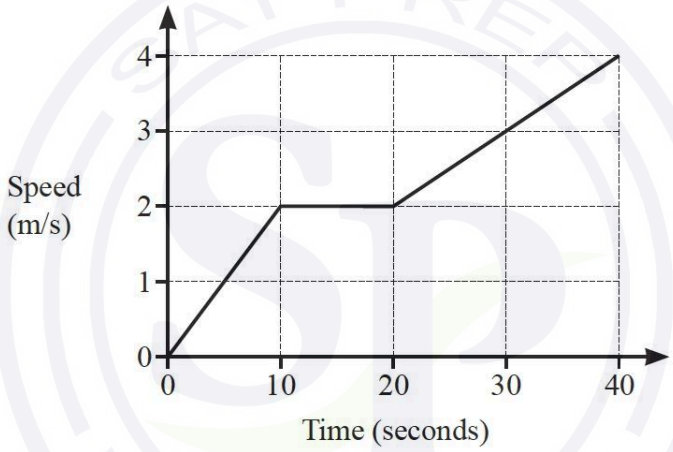
(a) Differentiate $6 + 4x - x^2$.

..... [2]

(b) Find the coordinates of the turning point of the graph of $y = 6 + 4x - x^2$.

(..... , ...) [2]

Question 58



The diagram shows the speed–time graph for the first 40 seconds of a cycle ride.

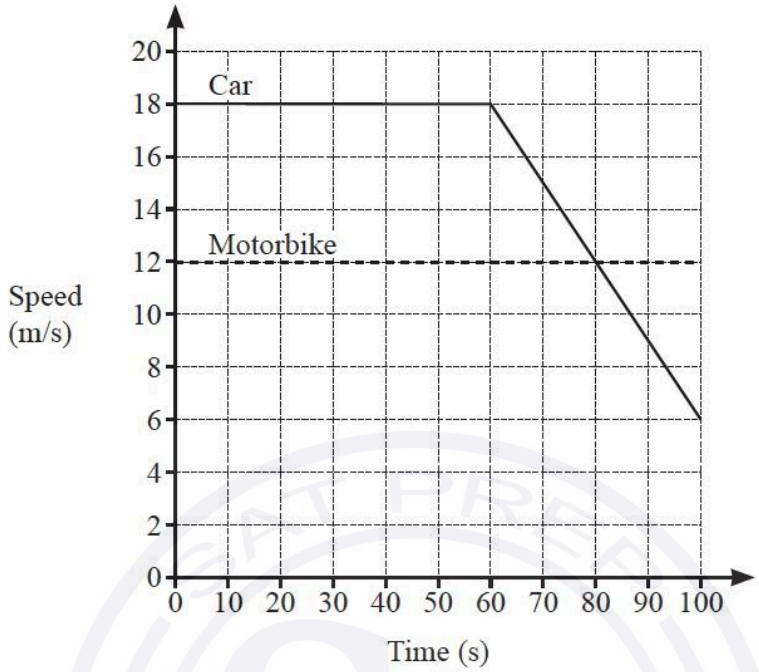
(a) Find the acceleration between 20 and 40 seconds.

..... m/s^2 [1]

(b) Find the total distance travelled.

..... m [3]

Question 59



The diagram shows the speed–time graph for 100 seconds of the journey of a car and of a motorbike.

(a) Find the deceleration of the car between 60 and 100 seconds.

..... m/s^2 [1]

(b) Calculate how much further the car travelled than the motorbike during the 100 seconds.

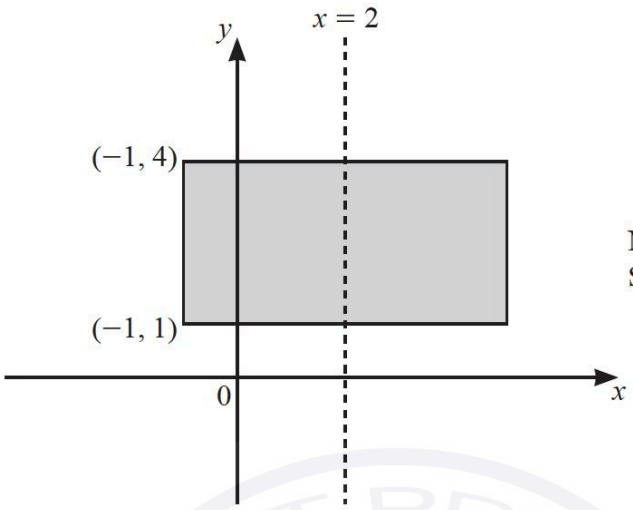
..... m [3]

Question 60

Find the gradient of a line that is perpendicular to $8y + 4x = 5$.

..... [2]

Question 61



The diagram shows a rectangle with a line of symmetry at $x = 2$.
Two vertices of the rectangle are at $(-1, 1)$ and $(-1, 4)$.

The shaded region is defined by the inequalities $a \leqslant x \leqslant b$ and $c \leqslant y \leqslant d$.

Find the values of a, b, c and d.

$a =$ .....

$b =$ .....

$c =$ .....

$d =$ ..... [2]

Question 62

A curve has equation $y = x^3 - 2x^2 + 5$.

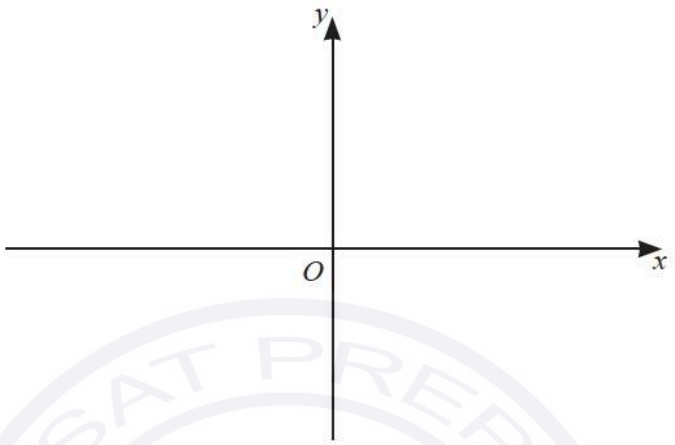
Find the coordinates of its two stationary points.

(....., ...) and (....., ...) [5]

Question 63

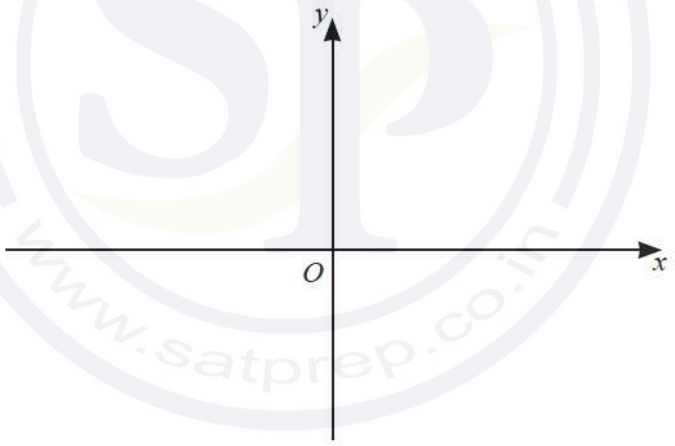
On the axes, sketch the graph of each of these functions.

(a) $y = \frac{1}{x}$



[2]

(b) $y = 4^x$



[2]

Question 64

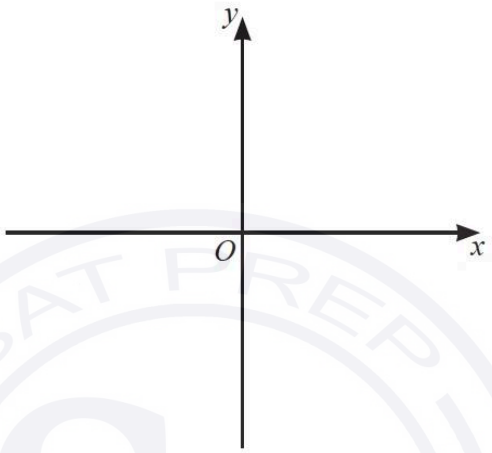
Find the x-coordinates of the points on the graph of $y = x^5 - 5x^4$ where the gradient is 0.

..... [4]

Question 65

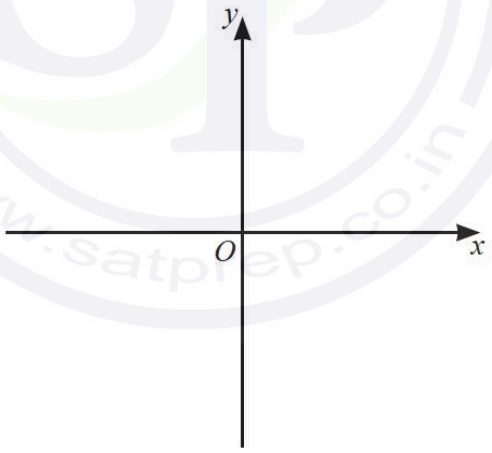
On the axes, sketch the graph of each of these functions.

(a) $y = \frac{2}{x}$



[2]

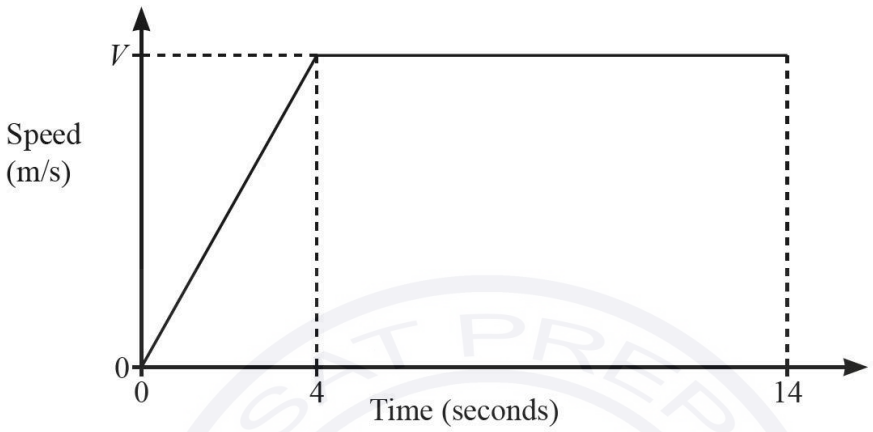
(b) $y = 2^{-x}$



[2]

Question 66

A car starts from rest and accelerates at a rate of $3\,\text{m/s}^2$ for 4 seconds.
The car then travels at a constant speed for 10 seconds.



NOT TO SCALE

The diagram shows the speed–time graph for this journey.

(a) Find the value of V.

$V =$ ..... [1]

(b) Calculate the total distance travelled by the car during the 14 seconds.

..... m [2]

Question 67

Find the gradient of the line that is perpendicular to the line $3y = 4x - 5$.

..... [2]

Question 68

A is the point (5, 7) and B is the point (9, −1).

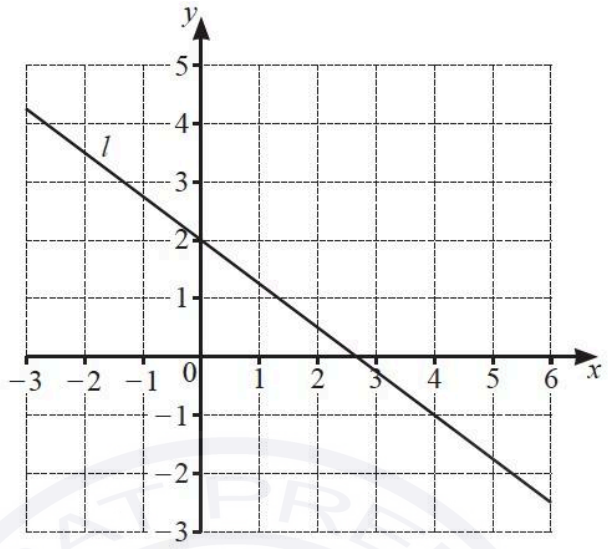
(a) Find the length AB.

..... [3]

(b) Find the equation of the line AB.

..... [3]

Question 69



(a) Find the gradient of line l.

..... [2]

(b) Find the equation of line l in the form $y = mx + c$.

$y =$ ..... [2]

(c) Find the equation of the line that is perpendicular to line l and passes through the point $(12, -7)$. Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

Question 70

A is the point $(5, -5)$ and B is the point $(9, 3)$.

(a) Find the coordinates of the midpoint of AB.

(....., ...) [2]

(b) Find the length of AB.

..... [3]

Question 71

Find the equation of the straight line that passes through the points $(2, -2)$ and $(3, 10)$.

Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

Question 72

(a) A is the point (3, 16) and B is the point (8, 31).

Find the equation of the line that passes through A and B.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

(b) The line CD has equation $y = 0.5x - 11$.

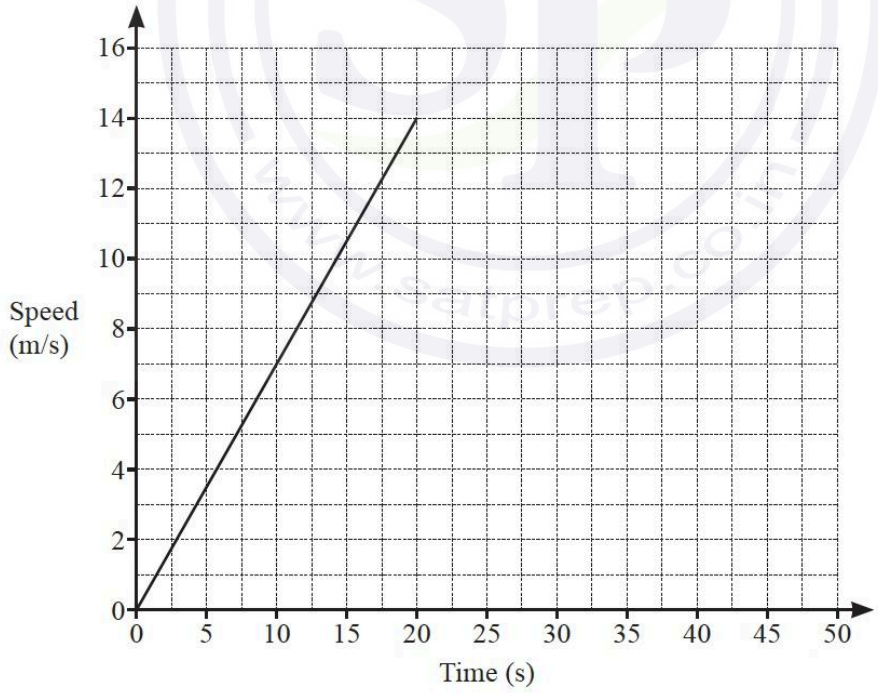
Find the gradient of a line that is perpendicular to the line CD.

..... [1]

Question 73

A car starts its journey by accelerating from rest at a constant rate of 0.7 m/s^2 for 20 seconds, before reaching a constant speed of 14 m/s.
It then travels at 14 m/s for a distance of 210 m.
The car then decelerates at a constant rate of 1.4 m/s^2, before coming to a stop.

On the grid, complete the speed–time graph for the car's journey.



[3]

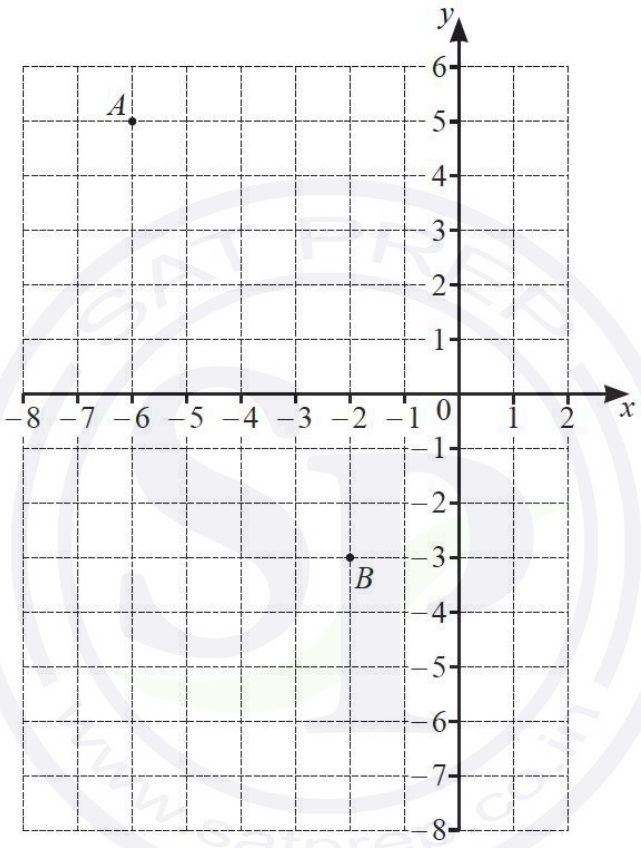
Question 74

Line L has equation $y = 4 - 5x$.

Find the equation of a line that is perpendicular to line L and passes through the point (0, 6).

..... [3]

Question 75



A is the point $(-6, 5)$ and B is the point $(-2, -3)$.

(a) Find the equation of the straight line, l, that passes through point A and point B.
Give your answer in the form $y = mx + c$.

$y =$ ..... [2]

(b) Find the equation of the line that is perpendicular to l and passes through the origin.

..... [2]

Question 76

(a) Write down the gradient of the line $y = 5x + 7$.

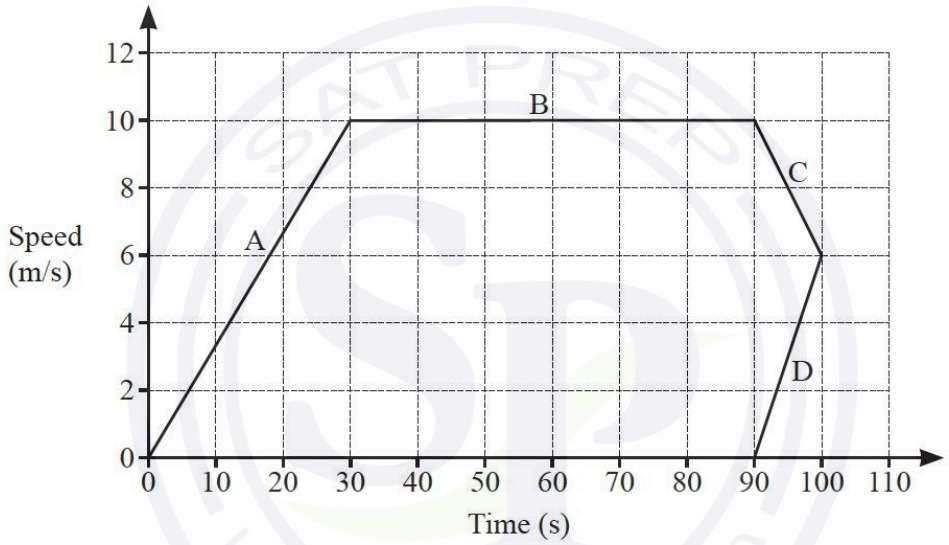
..... [1]

(b) Find the coordinates of the point where the line $y = 5x + 7$ crosses the y-axis.

(....., ...) [1]

Question 77

Abdul draws this speed–time graph for a journey.
The graph has four sections A, B, C and D.



Complete these statements about the speed–time graph.

Section ..... cannot be correct.

Section ..... shows constant speed.

Section ..... shows deceleration.

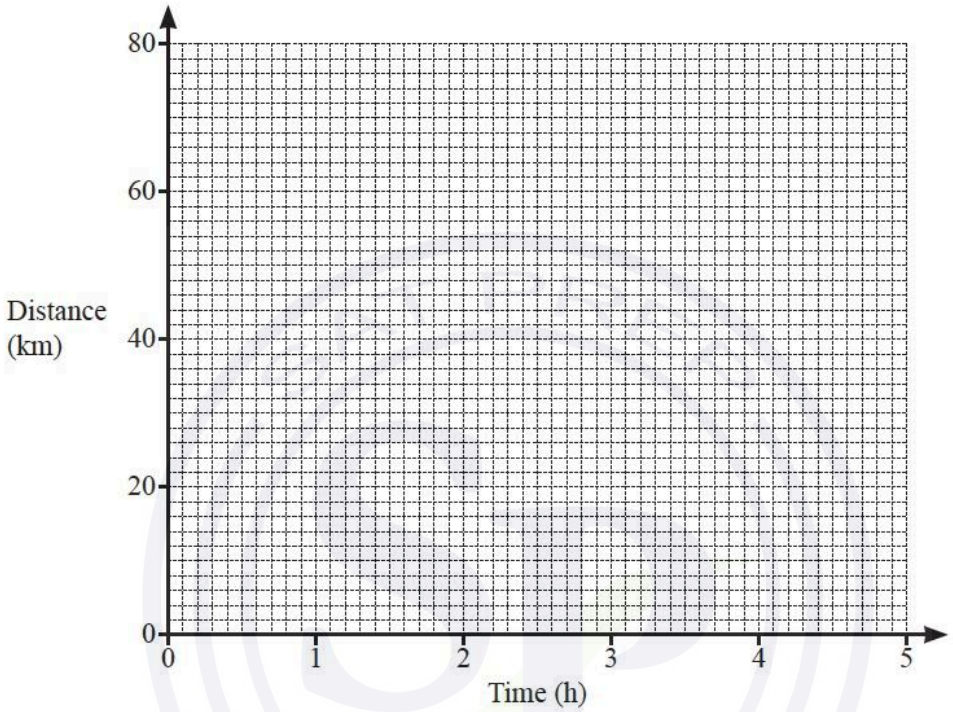
Section A shows acceleration of ..... m/s^2.

The distance travelled in the first 30 seconds of the journey is ..... m.

[4

Question 78

Annette cycles a distance of 70 km from Midville to Newtown.
Leaving Midville, she cycles for 1 hour 30 minutes at a constant speed of 20 km/h and then stops for 30 minutes.
She then continues the journey to Newtown at a constant speed of 16 km/h.

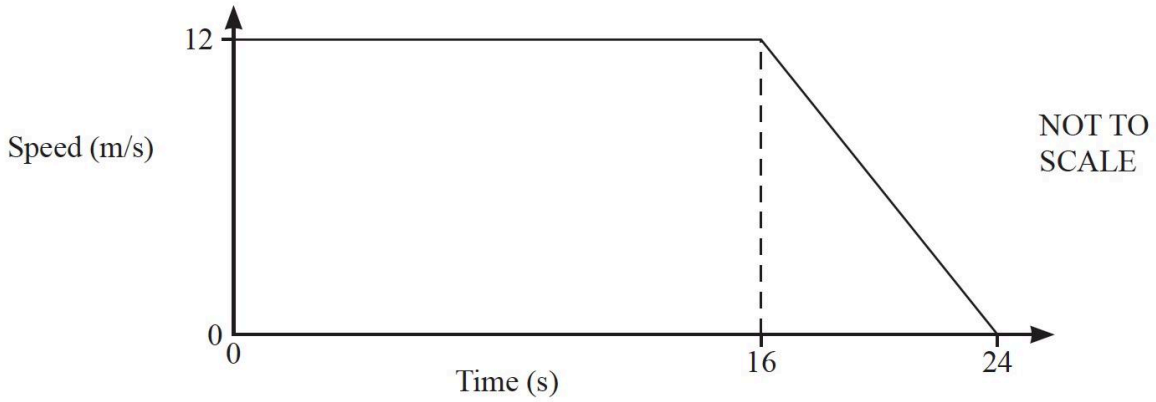


(a) On the grid, draw the distance–time graph for the journey. [3]

(b) Calculate the average speed for the whole journey.

..... km/h [3]

Question 79



The diagram shows the speed–time graph for 24 seconds of a car journey.

Calculate

(a) the deceleration of the car in the final 8 seconds,

..... m/s^2 [1]

(b) the total distance travelled during the 24 seconds.

..... m [2]

Question 80

A kite is drawn on a coordinate grid.
The diagonals of the kite intersect at the point $(-2, -5)$.

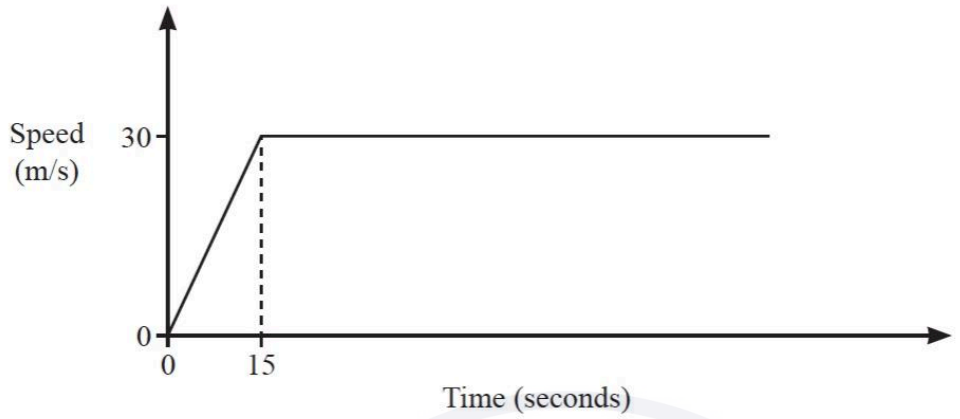
One diagonal has equation $y = 4x + 3$.

Find the equation of the other diagonal of the kite.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

Question 81

The diagram shows the speed–time graph for part of the journey of a car.



The car starts from rest and accelerates at a uniform rate for 15 seconds before reaching a constant speed of 30 m/s.

(a) Calculate the acceleration for the first 15 seconds.

..... m/s^2 [1]

(b) After T **minutes**, the total distance travelled is 45 **kilometres**.

Find the value of T.

$T =$ ..... min [4]

Question 82

A is the point $(-3, 5)$ and B is the point $(5, 2)$.

Find the coordinates of the midpoint of the line AB.

(..... , ...) [2]

Question 83

The graph of $y = (x-3)(x+b)(x+2)$ intersects the y-axis at -30.

(a) Find the value of b.

$b =$ ..... [2]

(b) When $x > 0$ the graph crosses the x-axis once.

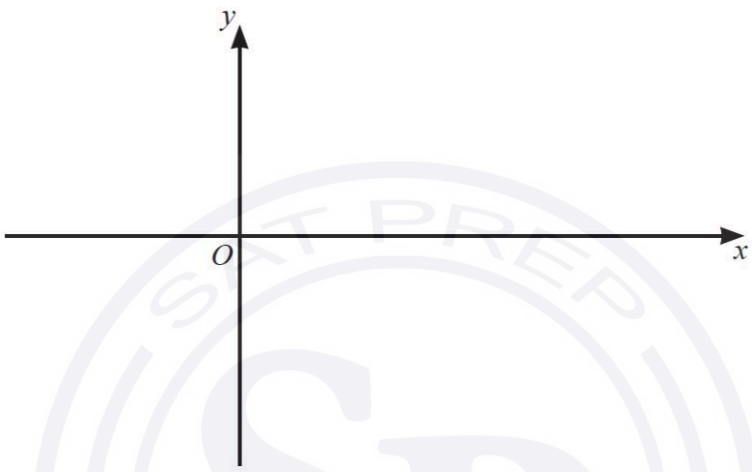
Write down the coordinates of this point.

(..... , ...) [1]

Question 84

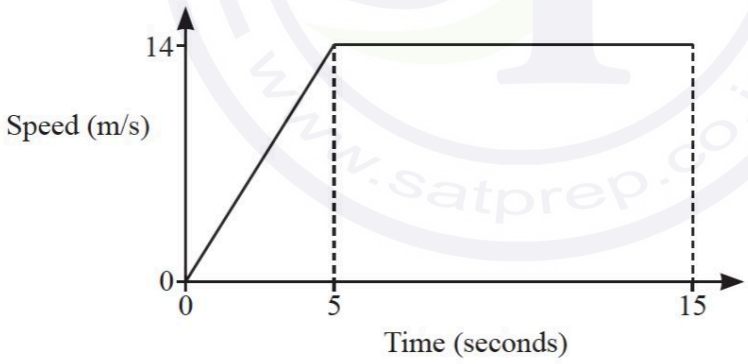
The graph of a cubic function has two turning points.
When $x < 0$ and when $x > 4$ the gradient of the graph is positive.
When $0 < x < 4$ the gradient of the graph is negative.
The graph passes through the origin.

Sketch the graph.



[2]

Question 85



NOT TO SCALE

The diagram shows the speed–time graph of the first 15 seconds of a car journey.

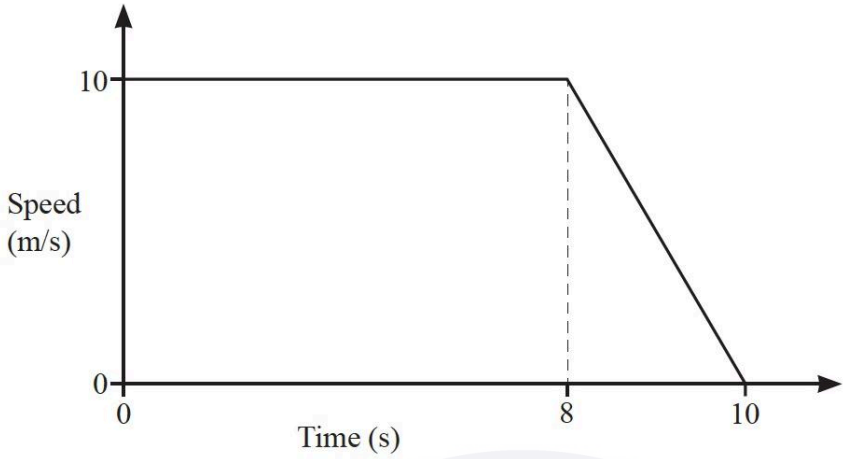
(a) Find the acceleration of the car during the first 5 seconds.

..... m/s^2 [1]

(b) Find the distance travelled during the 15 seconds.

..... m [2]

Question 86



NOT TO
SCALE

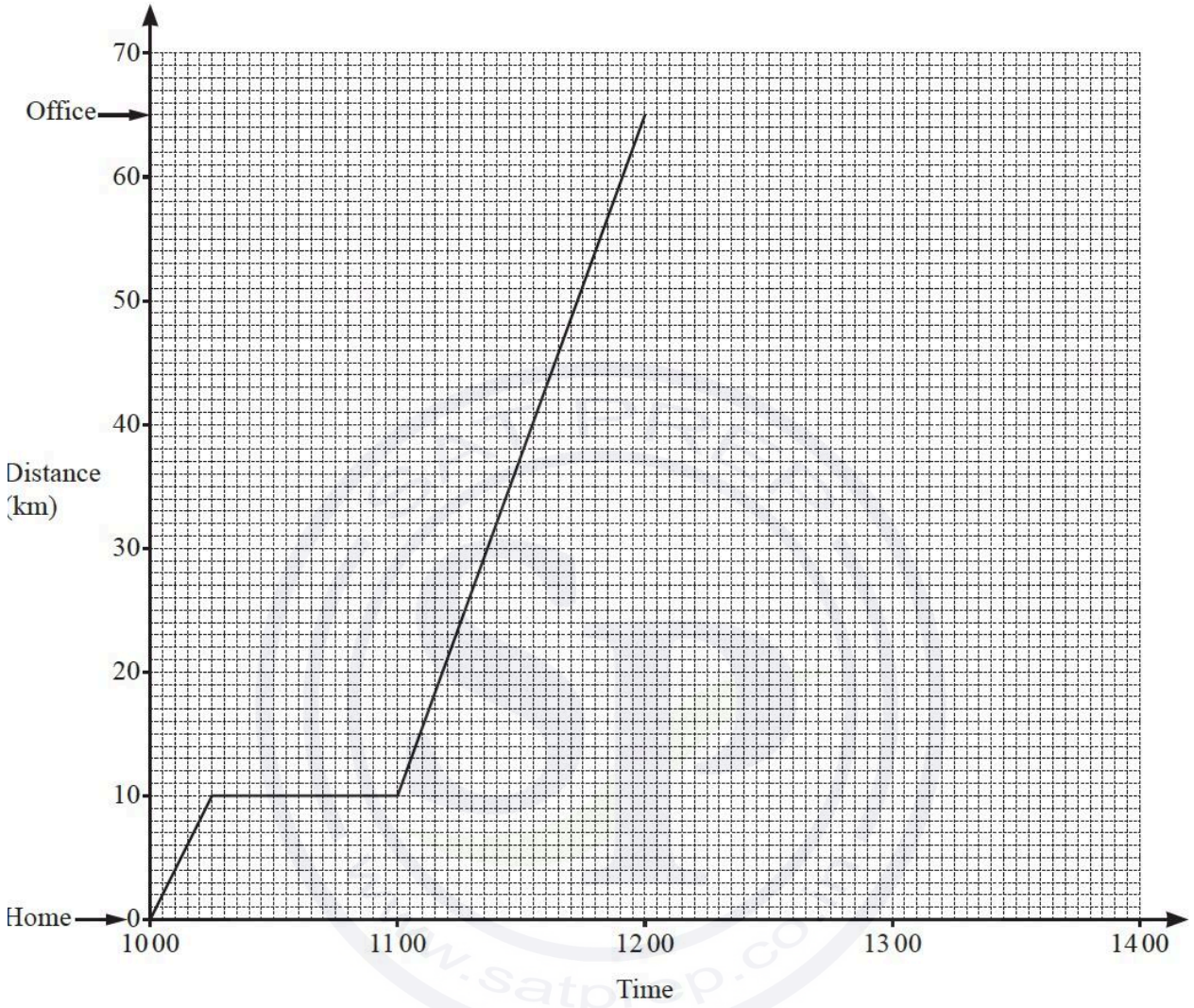
The diagram shows the speed–time graph for part of a car journey.

Calculate the total distance travelled during the 10 seconds.

..... m [2]

Question 87

The distance–time graph shows information about Kai's journey from home to the office.



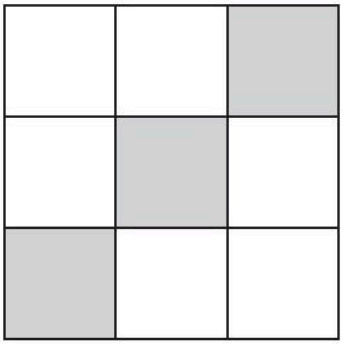
(a) Calculate the average speed, in km/h, for Kai's journey from home to the office.

..... km/h [2]

(b) When Kai arrives at the office, he finds his meeting is cancelled. He immediately returns home at a constant speed of 50 km/h.

Complete the distance–time graph to show his journey home. [1]

Question 88



(a) Complete the statement.

The diagram has rotational symmetry of order ..... . [1]

(b) On the diagram, draw all the lines of symmetry. [2]

Question 89

C is the point $(5, -1)$ and D is the point $(13, 15)$.

(a) Find the midpoint of CD.

(..... , ...) [2]

(b) Find the gradient of CD.

..... [2]

(c) Find the equation of the perpendicular bisector of CD.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

Question 90

A curve has equation $y = x^3 - 12x$.

(a) Find the gradient of the curve at the point $(1, -11)$.

..... [3]

(b) Find the coordinates of the turning points of the curve.

(..... , ...) and (..... , ...) [3]

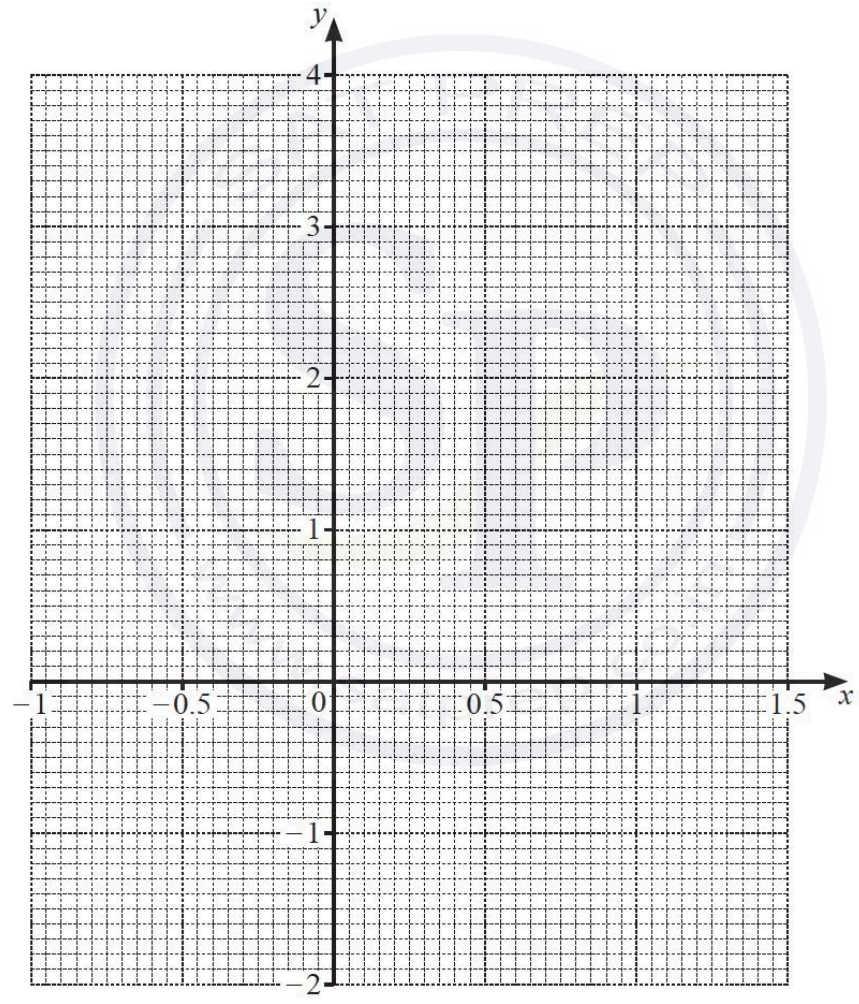
Question 91

The table shows some values for $y = 3x^2 - 2x - 1$.

x	-1	-0.5	0	0.5	1	1.5
y	4		-1		0	2.75

(a) Complete the table. [1]

(b) On the grid, draw the graph of $y = 3x^2 - 2x - 1$ for $-1 \leqslant x \leqslant 1.5$.



[3]

(c) By drawing a suitable straight line, solve the equation $3x^2 - 4x - 2 = 0$ for $-1 \leqslant x \leqslant 1.5$.

$x =$ ..... [3]

Question 92

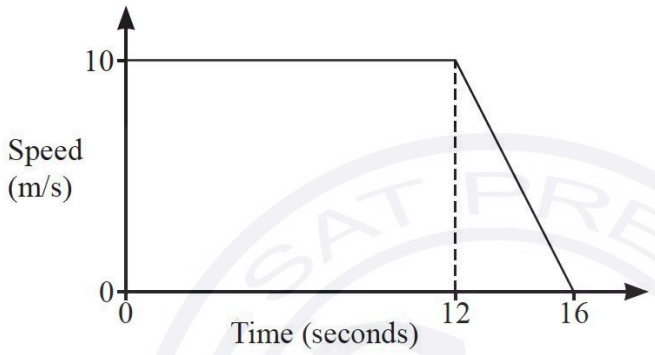
The derivative of $2ax^7 + 3x^k$ is $42x^6 + 15x^{k-1}$.

Find the value of a and the value of k.

$a =$ .....

$k =$ ..... [2]

Question 93



NOT TO SCALE

The diagram shows a speed–time graph for 16 seconds of a car journey.

(a) Find the deceleration of the car in the final 4 seconds.

..... m/s^2 [1]

(b) Find the total distance travelled during the 16 seconds.

..... m [2]

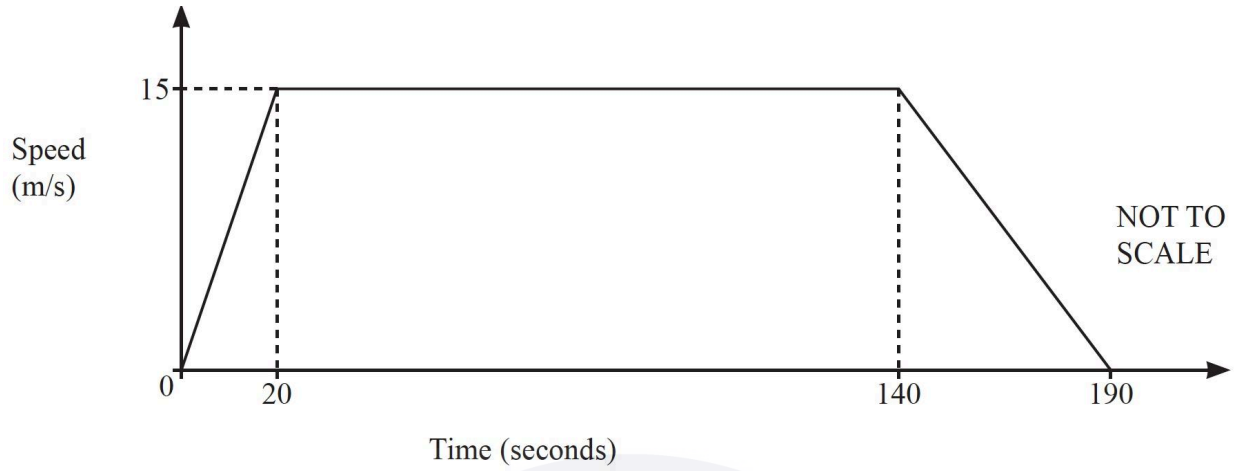
Question 94

A is the point (6, 1) and B is the point (2, 7).

Find the equation of the perpendicular bisector of AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [5]

Question 95



The speed–time graph shows information about a bus journey.

Calculate the total distance travelled by the bus.

..... m [3]

Question 96

The line $y = 2x - 5$ intersects the line $y = 3$ at the point P.

Find the coordinates of the point P.

(....., ...) [2]

Question 97

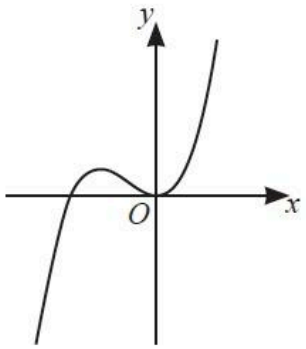
Find the gradient of the line joining the points $(-2, 7)$ and $(3, 1)$.

..... [2]

Question 98

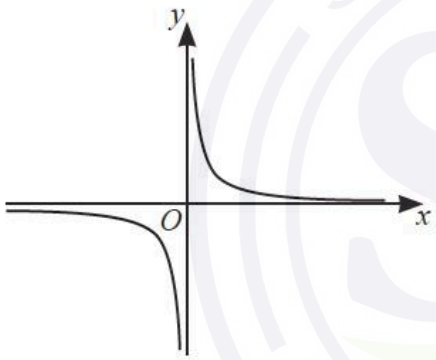
For each sketch, put a ring around the correct type of function shown.

(i)



linear cubic quadratic reciprocal exponential [1]

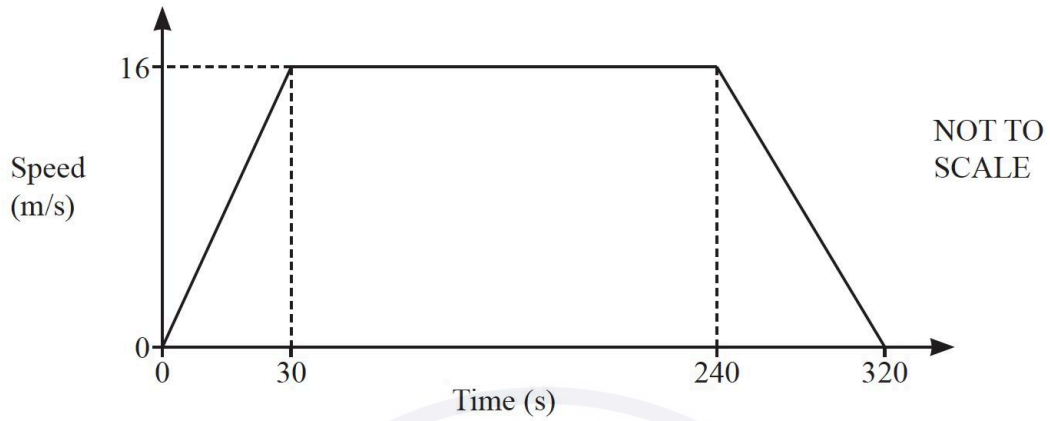
(ii)



linear cubic quadratic reciprocal exponential [1]

Question 99

The speed–time graph shows information about a car journey.



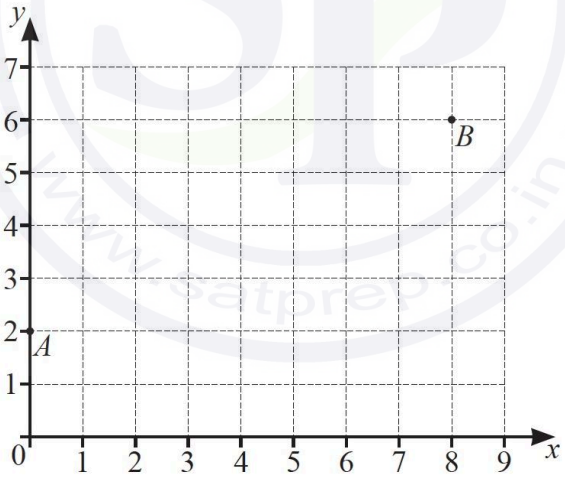
(a) Find the deceleration of the car between 240 and 320 seconds.

..... m/s^2 [1]

(b) Calculate the total distance the car travels during the 320 seconds.

..... m [3]

Question 100



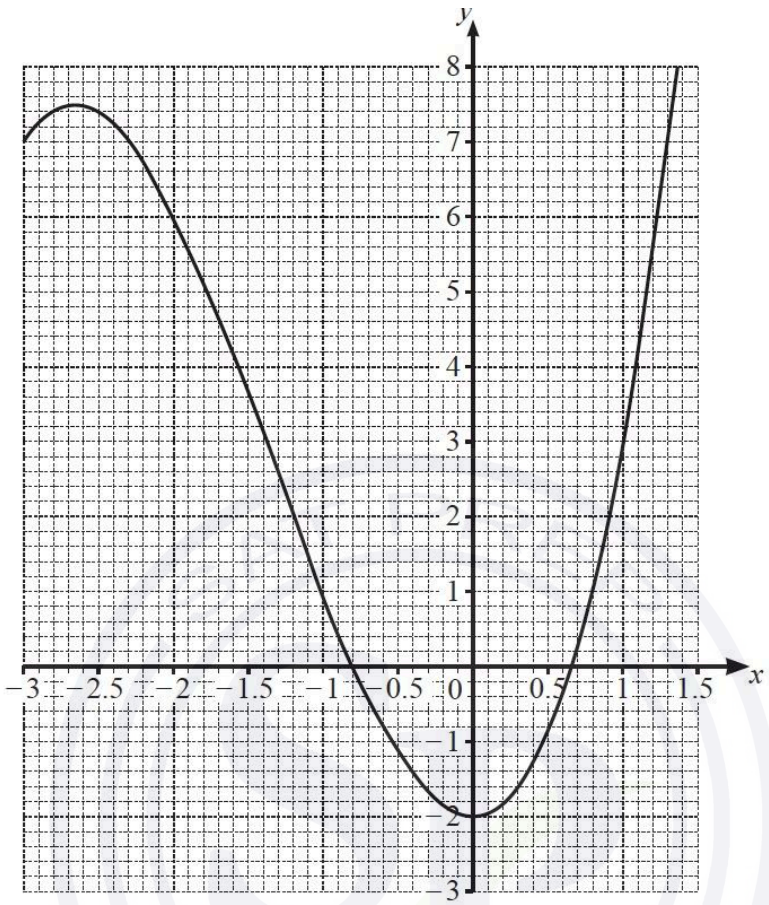
A is the point (0, 2) and B is the point (8, 6).

Find the equation of line AB.

Give your answer in the form $y = mx + c$.

$y =$ ..... [2]

Question 101

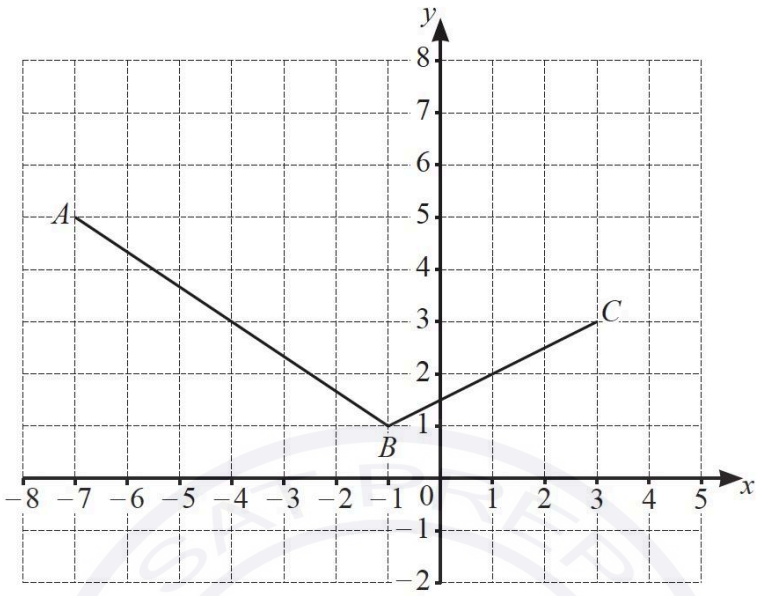


The diagram shows the graph of $y = x^3 + 4x^2 - 2$ for $-3 \leqslant x \leqslant 1.5$.

By drawing a suitable straight line, solve the equation $x^3 + 4x^2 - 2 = 2x$ for $-3 \leqslant x \leqslant 1.5$.

$x =$ ..... or $x =$ ..... [3]

Question 102



The diagram shows two sides of a parallelogram $ABCD$.

Find the coordinates of point D.

(..... , ...) [2]