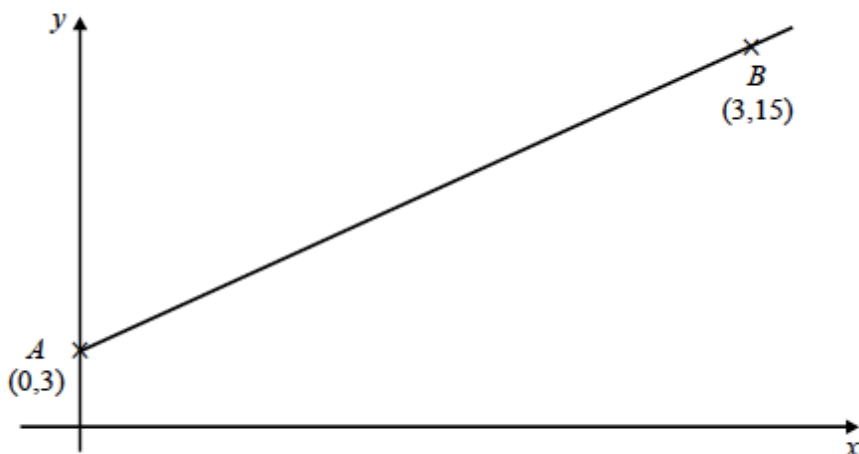


## Topic 8 Graphs 1 (Post-TT) [43]

1.

The diagram shows the points  $A(0,3)$  and  $B(3,15)$ .

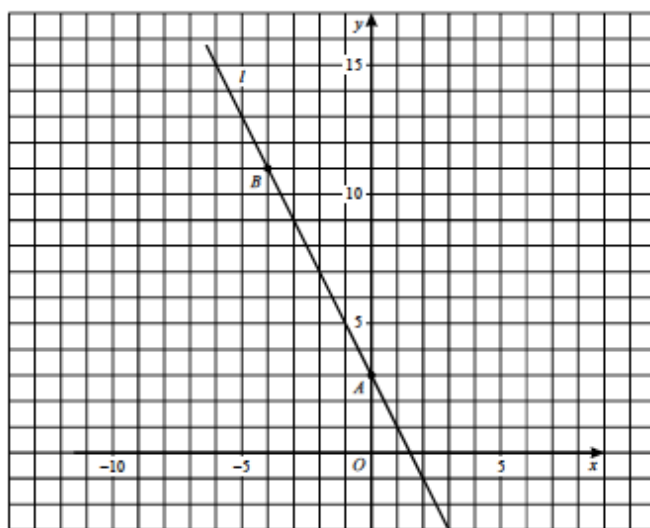


Find the equation of the line  $AB$ .

(Total 3 marks)

2.

The line  $l$  on the graph passes through the points  $A(0, 3)$  and  $B(-4, 11)$ .



- (a) Calculate the gradient of the line  $l$ . (2)
- (b) Write down the equation of the line  $l$ . (1)
- (c) Write down the equation of the line which also passes through the point  $(0, 3)$  but is perpendicular to line  $l$ . (2)

(Total 5 marks)

3.

Circle the equation of a line that is parallel to  $y = 5x - 2$

[1 mark]

$y = 2x - 5$

$y = 5x + 2$

$y = 3x - 2$

$y = -\frac{1}{5}x - 2$

4.

Match three of these equations with the graphs shown below.

$$y = x + 3$$

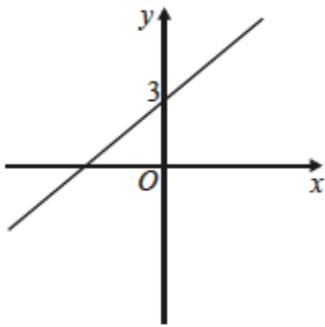
$$y = 3x$$

$$y = 3x^2$$

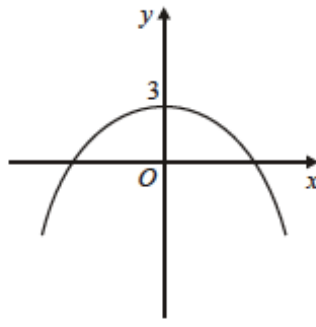
$$y = x^2 + 3$$

$$y = 3 - x^2$$

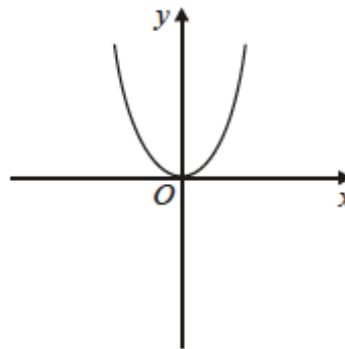
A.



B.



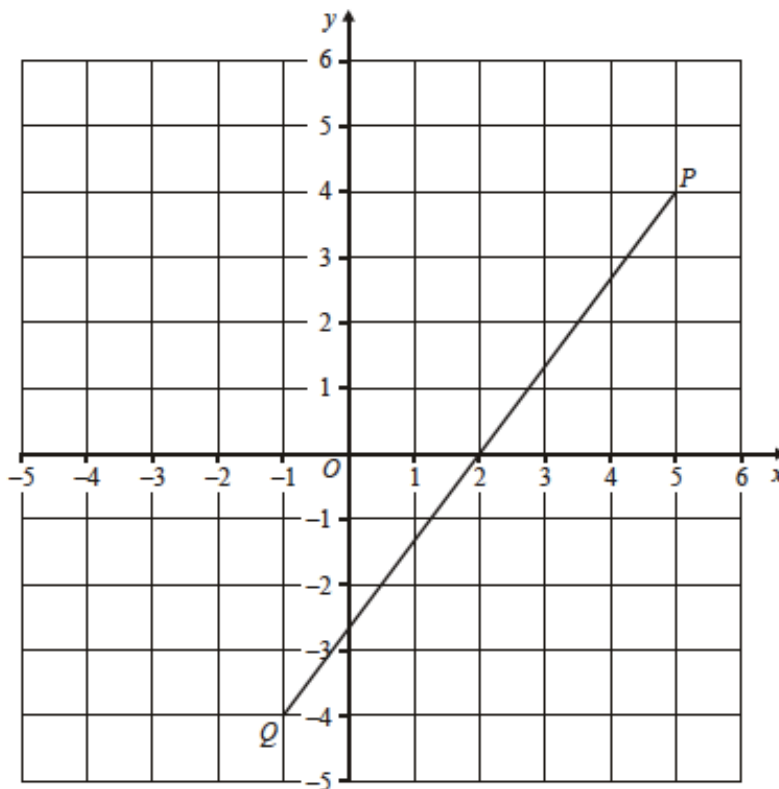
C.



(Total 3 marks)

5.

The line  $PQ$  is shown on the grid.



(a) Find the gradient of a line which is perpendicular to  $PQ$ .

(3)

(b) Hence find the equation of the perpendicular bisector of the line  $PQ$ .

(2)

(Total 5 marks)

6.

(a) Copy and complete the table for the graph of  $y = x^2 - 3x + 1$ .

$x$	-1	0	1	2	3	4
$y$		1	-1	-1		5

(2)

(b) On a grid  $-1 \leq x \leq 4$  (2 cm = 1 unit),  $-2 \leq y \leq 5$ , draw the graph of  $y = x^2 - 3x + 1$ .

(2)

(c) Use your graph to solve the equation  $x^2 - 3x + 1 = 0$ .

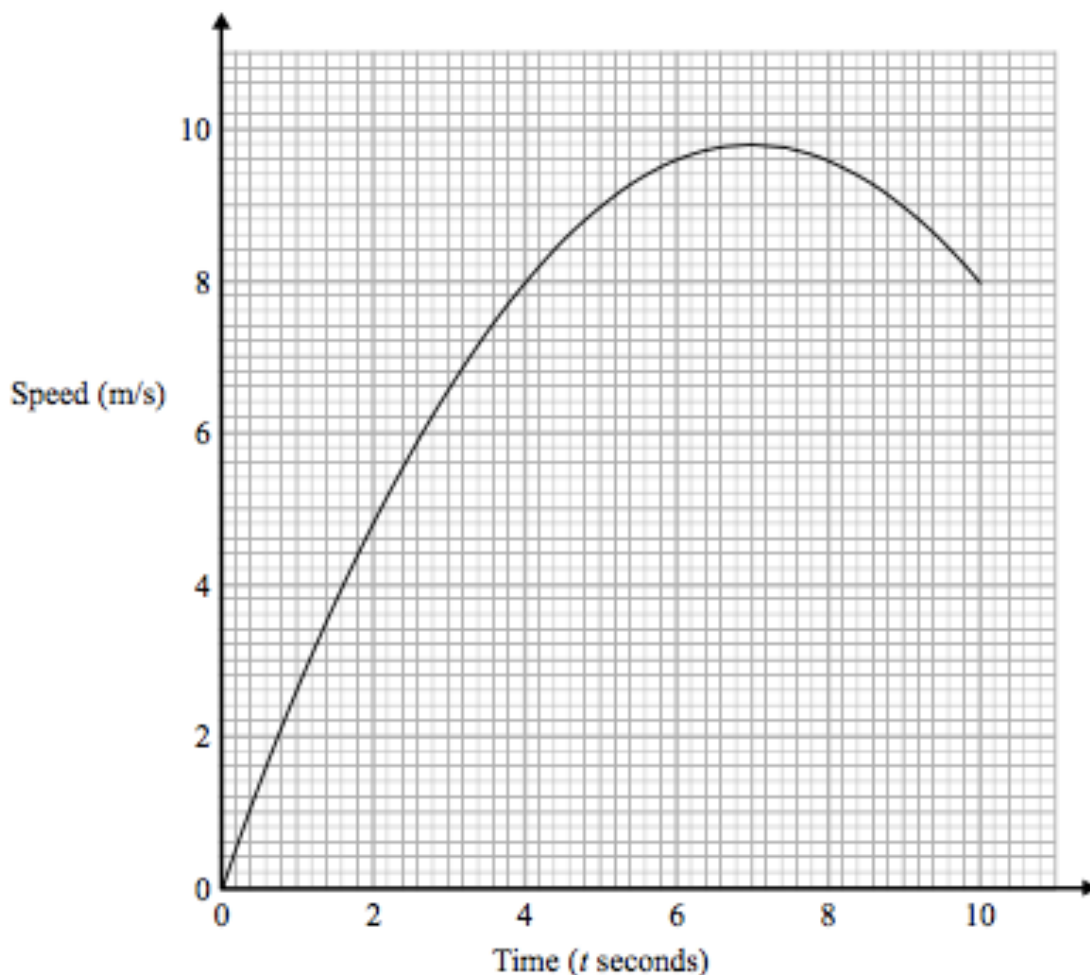
(2)

(Total 6 marks)

7.

Karol runs in a race.

The graph shows her speed, in metres per second,  $t$  seconds after the start of the race.



(a) Calculate an estimate for the gradient of the graph when  $t = 4$   
You must show how you get your answer.

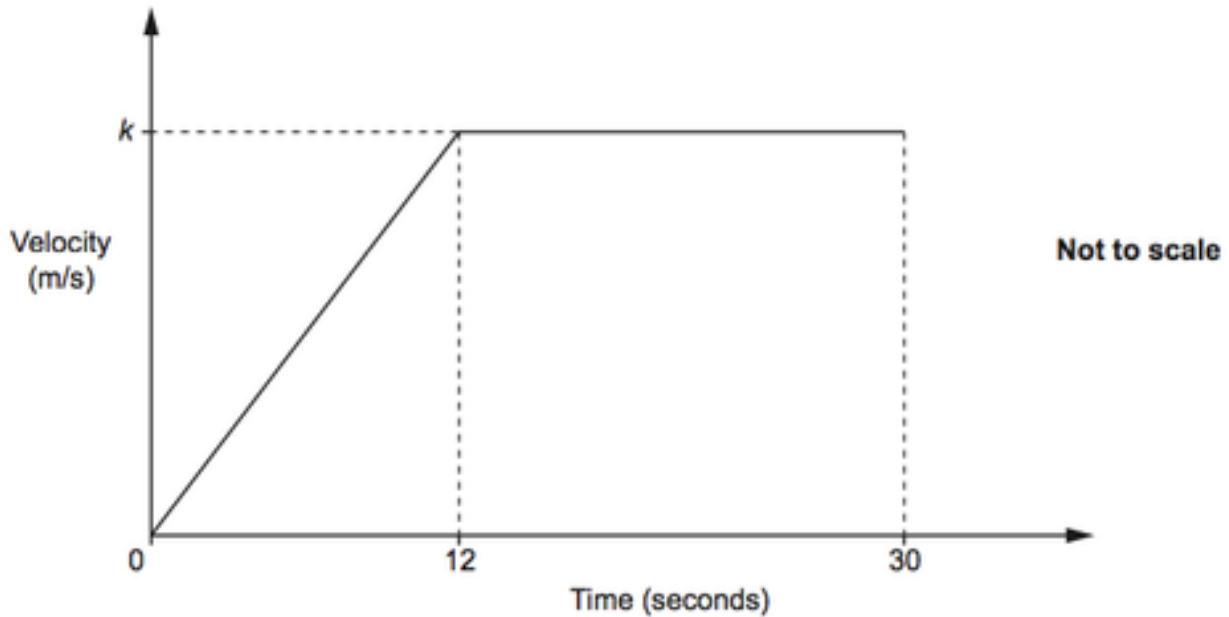
(b) Describe fully what your answer to part (a) represents.

(c) Explain why your answer to part (a) is only an estimate.

(Total 6 marks)

8.

The graph below shows the velocity of a train during the first 30 seconds after it leaves a station.



- (a) Show that the train travels a total distance of  $24k$  metres during the 30 seconds. [3]

A signal box is 410 metres from the station.

- (b) At the end of this 30 second period, the train passes the signal box.

Find the value of  $k$ .

Give your answer correct to 3 significant figures.

- (c) You may use this formula.

$$s = ut + \frac{1}{2}at^2$$

- (i) A second train passes the station at a velocity of 13 m/s.

It accelerates at a constant rate after passing the station and 25 seconds later it passes the signal box.

Find the acceleration.

- (ii) A third train passes the station at 15 m/s before accelerating at a constant rate of  $0.4 \text{ m/s}^2$  until it passes the signal box.

Find, to the nearest second, the time taken for the train to pass the signal box.

(Total 14 marks)