

4. The line l_1 has equation $4y - 3x = 10$

The line l_2 passes through the points $(5, -1)$ and $(-1, 8)$.

Determine, giving full reasons for your answer, whether lines l_1 and l_2 are parallel, perpendicular or neither.

(4)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



1. The line l_1 has equation $2x + 4y - 3 = 0$

The line l_2 has equation $y = mx + 7$, where m is a constant.

Given that l_1 and l_2 are perpendicular,

- (a) find the value of m . (2)

The lines l_1 and l_2 meet at the point P .

- (b) Find the x coordinate of P . (2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



4. In 1997 the average CO₂ emissions of new cars in the UK was 190 g/km.

In 2005 the average CO₂ emissions of new cars in the UK had fallen to 169 g/km.

Given A g/km is the average CO₂ emissions of new cars in the UK n years after 1997 and using a linear model,

(a) form an equation linking A with n .

(3)

In 2016 the average CO₂ emissions of new cars in the UK was 120 g/km.

(b) Comment on the suitability of your model in light of this information.

(3)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Answer ALL questions. Write your answers in the spaces provided.

- The line l passes through the points $A(3, 1)$ and $B(4, -2)$.

Find an equation for l .

(3)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 1 is 3 marks)

6. Each year Lin pays into a savings scheme. In year 1 she pays in £600. Her payments then increase by £80 a year, so that she pays £680 into the savings scheme in year 2, £760 in year 3 and so on. In year N , Lin pays £1000 into the savings scheme.

(a) Find the value of N . (2)

(b) Find the total amount that Lin pays into the savings scheme from year 1 to year 15 inclusive. (2)

Saima starts paying into a different savings scheme at the same time as Lin starts paying into her savings scheme.

In year 1 she pays in £ A . Her payments increase by £ A each year so that she pays £ $2A$ in year 2, £ $3A$ in year 3 and so on.

Given that Saima and Lin have each paid, in total, the same amount of money into their savings schemes after 15 years,

(c) find the value of A . (3)

Handwriting area with 20 horizontal lines.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



10.

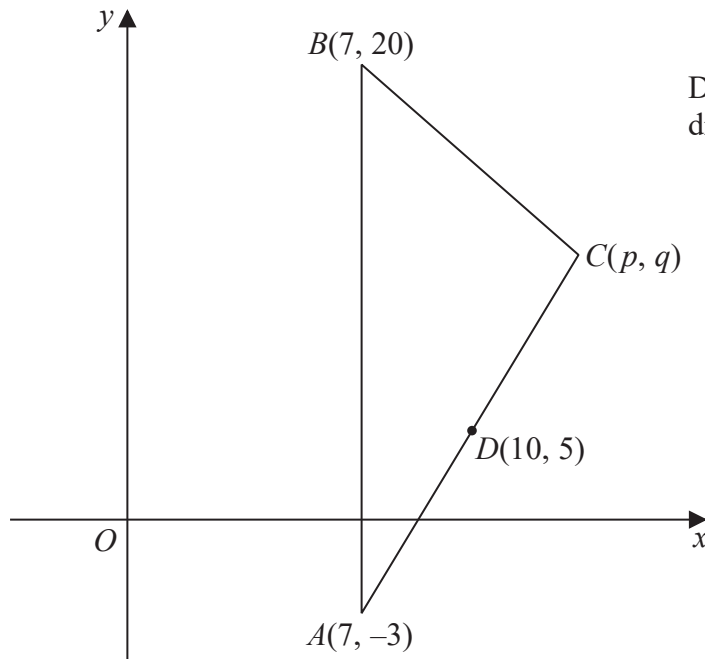


Diagram NOT drawn to scale

Figure 4

The points $A(7, -3)$, $B(7, 20)$ and $C(p, q)$ form the vertices of a triangle ABC , as shown in Figure 4. The point $D(10, 5)$ is the midpoint of AC .

(a) Find the value of p and the value of q . (2)

The line l passes through D and is perpendicular to AC .

(b) Find an equation for l , in the form $ax + by = c$, where a , b and c are integers. (5)

Given that the line l intersects AB at E ,

(c) find the exact coordinates of E . (2)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

3. The line l_1 has equation $2x + 3y = 6$

The line l_2 is parallel to the line l_1 and passes through the point $(3, -5)$.

Find the equation for the line l_2 in the form $y = mx + c$, where m and c are constants.

(4)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



6.

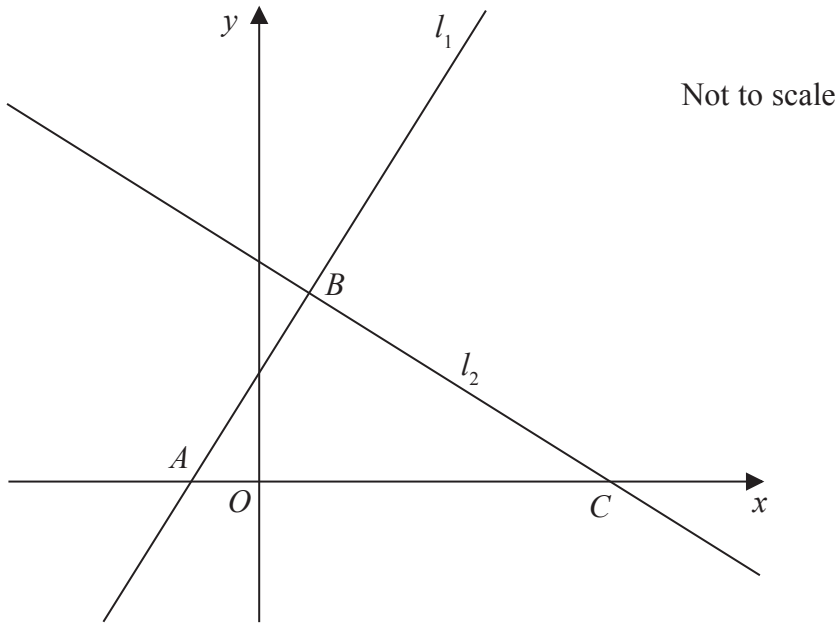


Figure 2

The straight line l_1 has equation $2y = 3x + 5$

The line l_1 cuts the x -axis at the point A , as shown in Figure 2.

- (a) (i) State the gradient of l_1
 - (ii) Write down the x coordinate of point A .
- (3)**

Another straight line l_2 intersects l_1 at the point B with x coordinate 1 and crosses the x -axis at the point C , as shown in Figure 2.

Given that l_2 is perpendicular to l_1

- (b) find an equation for l_2 in the form $ax + by + c = 0$, where a , b and c are integers, **(5)**
- (c) find the exact area of triangle ABC . **(3)**



5.

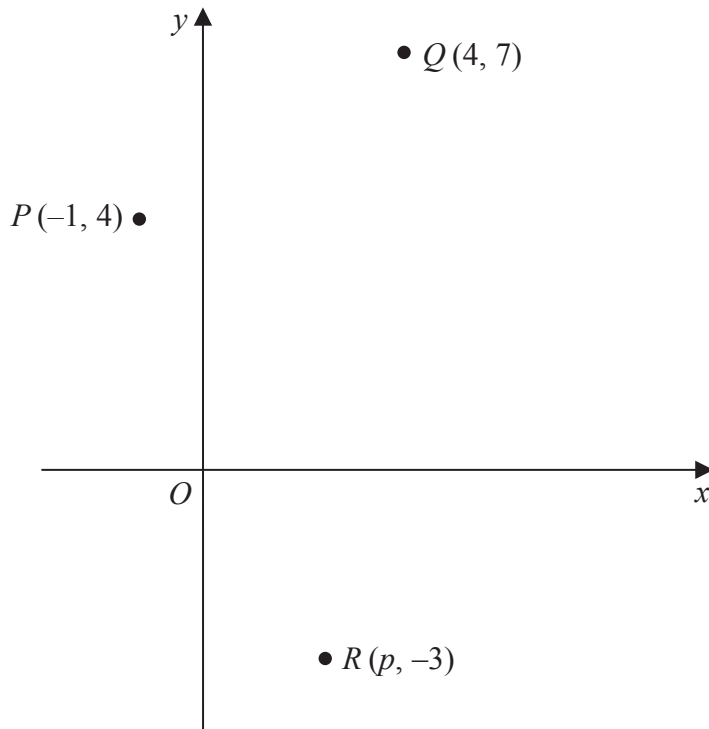


Diagram not drawn to scale

Figure 3

Figure 3 shows the points P , Q and R .

Points P and Q have coordinates $(-1, 4)$ and $(4, 7)$ respectively.

(a) Find an equation for the straight line passing through points P and Q .

Give your answer in the form $ax + by + c = 0$, where a , b and c are integers. **(4)**

The point R has coordinates $(p, -3)$, where p is a positive constant.

Given that angle $QPR = 90^\circ$,

(b) find the value of p . **(3)**

8.

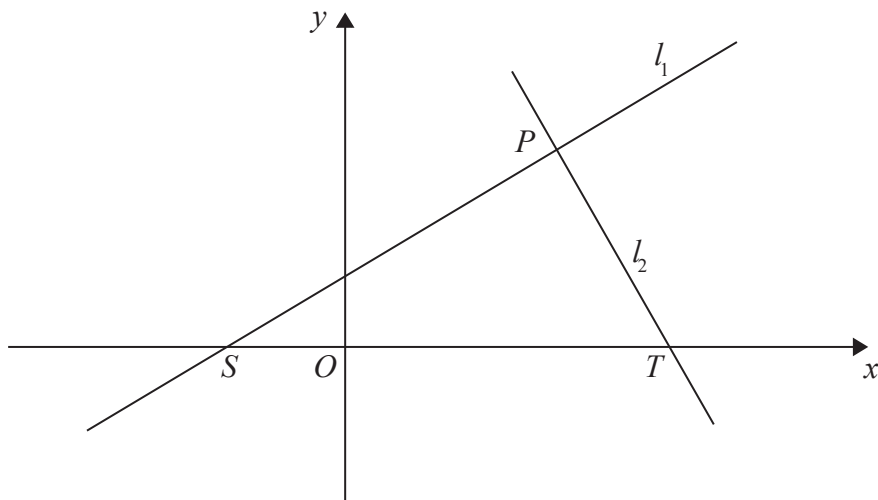


Figure 1

The straight line l_1 , shown in Figure 1, has equation $5y = 4x + 10$

The point P with x coordinate 5 lies on l_1

The straight line l_2 is perpendicular to l_1 and passes through P .

- (a) Find an equation for l_2 , writing your answer in the form $ax + by + c = 0$ where a , b and c are integers. (4)

The lines l_1 and l_2 cut the x -axis at the points S and T respectively, as shown in Figure 1.

- (b) Calculate the area of triangle SPT . (4)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

