

Coordinate Geometry

1. (a) $p \in \mathbb{R}$ is a constant.

The point $(p, 5)$ lies on the line

$$3x - 2y + 28 = 0.$$

Find the value of p .

$$p = \underline{\hspace{2cm}}$$

- (b) The line l has equation

$$y = -\frac{1}{3}x + 11.$$

The line h has equation

$$2x - 5y + 10 = 0.$$

Work out the size of the acute angle between the lines l and h . Give your answer correct to the nearest degree.

- (c) A line cuts the x -axis at the point $A(a, 0)$ and the y -axis at $B(0, b)$, where $a, b \in \mathbb{Z}$.

The slope of this line is $-\frac{2}{3}$.

The area of the triangle enclosed by this line, the x -axis and the y -axis is 12 square units.

There are two different lines that satisfy these conditions. Find the equation of each of these lines.

It may be useful to draw a diagram.

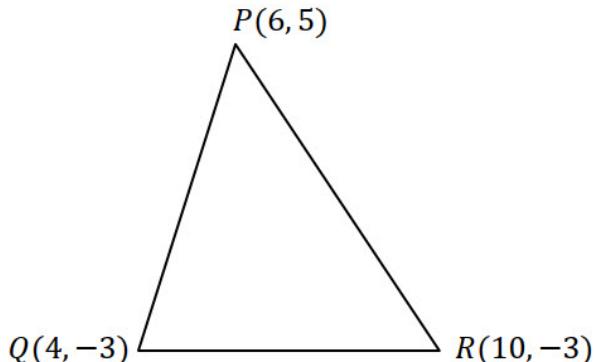
Line 1: $\underline{\hspace{2cm}}$

Line 2: $\underline{\hspace{2cm}}$

2. (a) The vertices of the triangle PQR are

$$P(6, 5), Q(4, -3), R(10, -3).$$

A diagram of the triangle is shown below.



- i. Write down the midpoint of the line segment $[PQ]$. $(,)$
 - ii. Hence, or otherwise, find the equation of the perpendicular bisector of $[PQ]$.
 - iii. Hence, find the co-ordinates of the *circumcentre* of the triangle PQR , the point where the perpendicular bisectors of the sides meet.
- (b) The line AB intersects the x -axis at A and the y -axis at B . The point $(-6, 2)$ is the midpoint of the line segment $[AB]$.
- i. Find the co-ordinates of A . $A = (,)$
 - ii. Find the co-ordinates of B . $B = (,)$