Section A — Concepts and Skills — 150 marks

Answer **any five** questions from this section.

Question 1 **(30 marks)**

(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.

$p =$ _____

(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:

Line 2:

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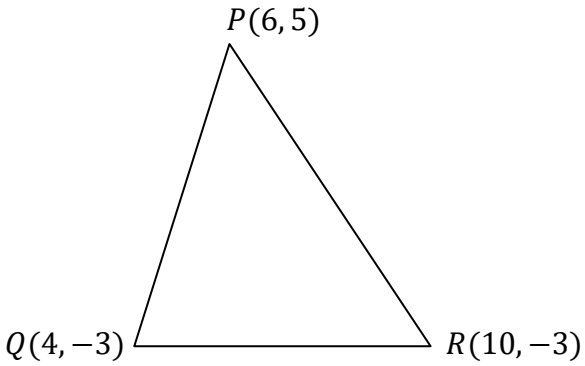
Question 1 **(30 marks)**

(a) The vertices of the triangle PQR are $P(6, 5)$, $Q(4, -3)$, and $R(10, -3)$.



(i) Write down the midpoint of $[PQ]$.

(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 (that is, 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 $[AB]$.

Find the co-ordinates of A and of B.

$A = (\quad , \quad)$ $B = (\quad , \quad)$