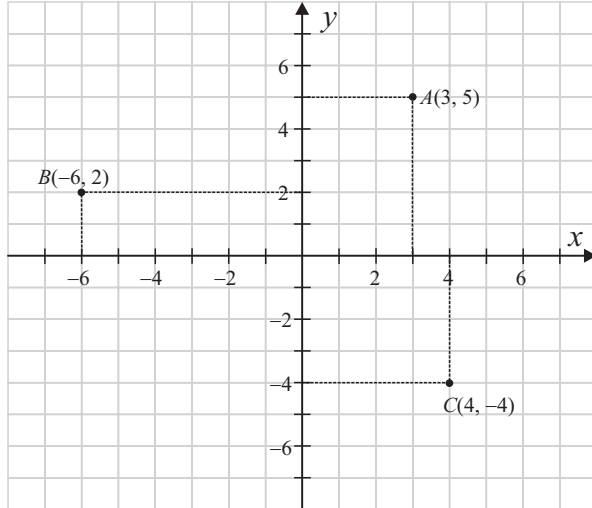


SAMPLE PAPER 2014 (SET F): PAPER 2

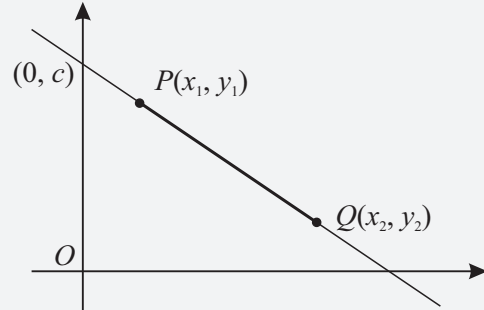
QUESTION 3 (25 MARKS)

QUESTION 3 (a)

Points: $A(3, 5)$, $B(-6, 2)$, $C(4, -4)$



FORMULAE AND TABLES BOOK Co-ordinate geometry: Line



Slope of PQ [page 18]

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Equation of PQ [page 18]

$$y - y_1 = m(x - x_1)$$

$$y = mx + c$$

Area of triangle OPQ [page 18]

$$\frac{1}{2} |x_1 y_2 - x_2 y_1|$$

QUESTION 3 (b)

Slope m of AB : $A(3, 5) = (x_1, y_1)$, $B(-6, 2) = (x_2, y_2)$

$$m = \frac{2 - 5}{-6 - 3} = \frac{-3}{-9} = \frac{1}{3}$$

Equation of AB : Point $(x_1, y_1) = (3, 5)$, slope $m = \frac{1}{3}$

$$y - 5 = \frac{1}{3}(x - 3) \leftarrow \text{Multiply across by 3.}$$

$$3(y - 5) = 1(x - 3) \leftarrow \text{Multiply out brackets.}$$

$$3y - 15 = x - 3 \leftarrow \text{Bring all terms to the same side.}$$

$$x - 3y + 12 = 0$$

QUESTION 3 (c)

There are two ways to find the area of a triangle:

1. Use the formula.

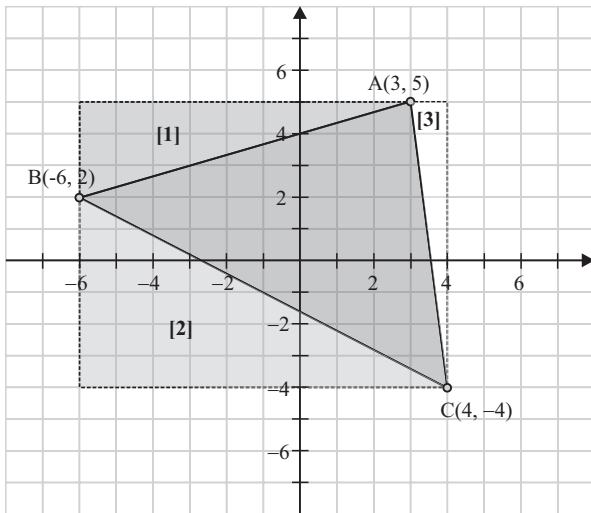
$$A = \frac{1}{2} |x_1 y_2 - x_2 y_1|$$

To use this formula one of the points must be at (0, 0). Translate A(3, 5) to (0, 0) by subtracting 3 from the x-coordinate and 5 from the y-coordinate. Do the same to the other two points.

A(3, 5)	→ (0, 0)	(x_1, y_1)	(x_2, y_2)
B(-6, 2)	→ (-9, -3)	↓ ↓	↓ ↓
C(4, -4)	→ (1, -9)	(-9, -3)	(1, -9)

$$A = \frac{1}{2} |(-9)(-9) - (1)(-3)| = \frac{1}{2} |81 + 3| = \frac{1}{2} (84) = 42$$

2. Use a graphical method.



Draw a rectangle around the three points: A, B and C.

Three right-angled triangles are formed called [1], [2] and [3]. You can work out their area using the formula:

$$A = \frac{1}{2} bh$$

$$\begin{aligned}
 \text{Area of triangle } ABC &= \text{Area of Rectangle} - [\text{Area } \Delta 1 + \text{Area } \Delta 2 + \text{Area } \Delta 3] \\
 &= (10)(9) - \left[\frac{1}{2} (9)(3) + \frac{1}{2} (10)(6) + \frac{1}{2} (1)(9) \right] \\
 &= 90 - \frac{1}{2} [27 + 60 + 9] \\
 &= 90 - \frac{1}{2} [96] \\
 &= 90 - 48 \\
 &= 42
 \end{aligned}$$
