2003 Sample Paper

Question 2

Q2. (a) a(2,-3) and b(-3,9) are two points.

(i) Find the slope of ab.

(ii) Find the length of [ab].

(b) The line $2x - 3y + 9 = 0$ cuts the x-axis at p and the y-axis at q.

(i) Find the co-ordinates of p and the co-ordinates of q.

(ii) Find the area of the triangle poq, where o is the origin.

(c) Prove that if two triangles are equiangular, the lengths of their corresponding sides are in proportion.

Solution

Q2. (a) a(2,-3) and b(-3,9) are two points.

(i) Find the slope of ab.

(ii) Find the length of [ab].

(i) Must find the slope between $\underset{(x_1, y_1)}{a(2,-3)}$ and $\underset{(x_2, y_2)}{b(-3,9)}$

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

$$= \frac{9-(-3)}{-3-2}$$ put figures in and take care of the signs

$$= \frac{12}{-5} = -\frac{12}{5}$$

(ii) Find the length of $\underset{(x_1, y_1)}{a(2,-3)}$ and $\underset{(x_2, y_2)}{b(-3,9)}$

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-3-2)^2 + (9-(-3))^2}$$

$$= \sqrt{(-5)^2 + (12)^2}$$

$$= \sqrt{25+144}$$

$$= \sqrt{169}$$

$$= 13$$

(b) The line $2x - 3y + 9 = 0$ cuts the x-axis at p and the y-axis at q.

(i) Find the co-ordinates of p and the co-ordinates of q.

p is where $2x - 3y + 9 = 0$ cuts x - axis so sub in $y = 0$ to get

$$2x + 9 = 0$$

$$2x = -9$$

$$x = -4\frac{1}{2}$$

p is the point $\left(-4\frac{1}{2}, 0\right)$

q is where $2x - 3y + 9 = 0$ cuts y - axis so sub in $x = 0$ to get

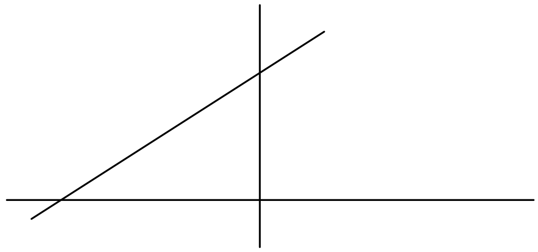
$$-3y + 9 = 0$$

$$-3y = -9$$

$$y = 3$$

q is the point (0,3)

(ii) Find the area of the triangle poq, where o is the origin.



$\text{Area} = \frac{1}{2}\text{base} \times \text{perpendicular height}$

Base is the horizontal distance from to 0 to –4.5, which is 4.5

Perpendicular distance is the distance from 0 to 3, which is 3

$\text{Area} = \frac{1}{2}(4.5)(3) = 6.75$

(c) Prove that if two triangles are equiangular, the lengths of their corresponding sides are in proportion.

Theorem proof