Question 5 (25 marks)

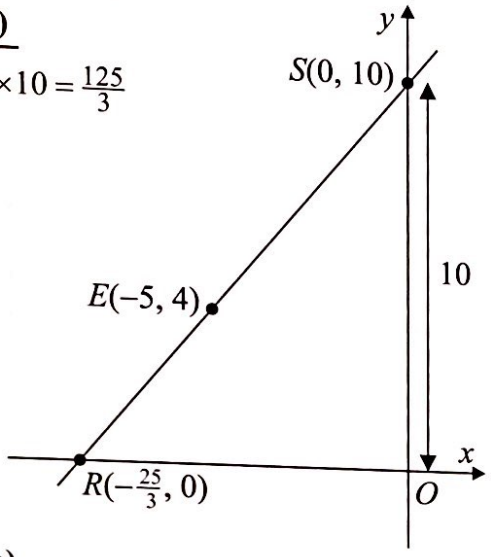
Question 5 (a)

$\text{Area} = \frac{1}{2}|OR| \times 10 = \frac{125}{3}$

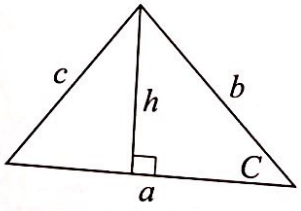
$5|OR| = \frac{125}{3}$

$\therefore |OR| = \frac{25}{3}$

$\therefore R(-\frac{25}{3}, 0)$



Formulae and Tables Book:
Length and area (page 9)
Triangle



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

$A = \frac{1}{2}ab\sin C$

Question 5 (b)

$R(-\frac{25}{3}, 0)$, $S(0, 10)$

$\text{Slope of } RS = \frac{10-0}{0-(-\frac{25}{3})} = \frac{6}{5}$

Equation of RS: $y - 10 = \frac{6}{5}(x - 0)$

$5y - 50 = 6x$

$6x - 5y + 50 = 0$

$E(-5, 4) \in RS : 6x - 5y + 50 = 0?$

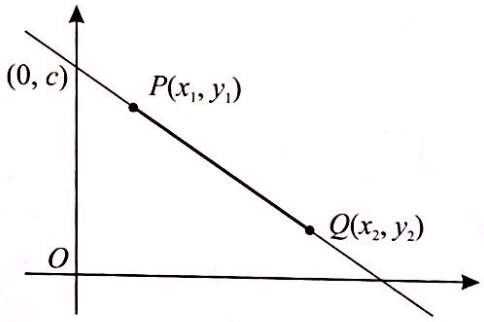
$6(-5) - 5(4) + 50$

$= -30 - 20 + 50$

$= 0$

$\therefore E(-5, 4) \in RS$

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]

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

$$y = mx + c$$

Marking Scheme Notes

Question 5 (a) [Scale 10C (0, 3, 7, 10)]

3: • Relevant area of triangle formula

7: • $|OR|$ found but x ordinate of R not stated
• Substantially correct work with one error

Question 5 (b) [Scale 10C (0, 3, 7, 10)]

3: • Effort at finding one slope
• Effort at finding equation of RS

7: • Relevant conclusion not stated or implied
• E inserted into equation of RS but relevant conclusion not stated or implied

Question 5 (c)

$y = mx + c$

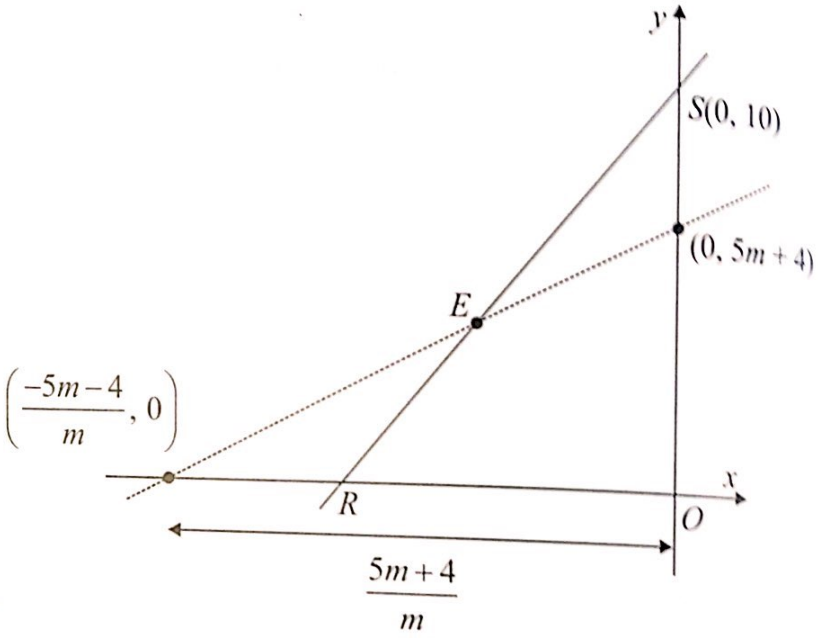
$E(-5, 4) \in y \Rightarrow 4 = -5m + c$

$\therefore c = 5m + 4$

$y = mx + 5m + 4$

$x = 0 : y = 5m + 4$

$\therefore (0, 5m + 4)$ is the y intercept



$y = 0 : 0 = mx + 5m + 4$

$mx = -5m - 4$

$x = \dfrac{-5m-4}{m}$

$\therefore \left(\dfrac{-5m-4}{m}, 0\right)$ is the x intercept

$\text{Area} = \dfrac{1}{2}\left(\dfrac{5m+4}{m}\right)(5m+4) = \dfrac{125}{3}$

$3(5m+4)^2 = 250m$

$3(25m^2 + 40m + 16) = 250m$

$75m^2 + 120m + 48 = 250m$

$75m^2 - 130m + 48 = 0$

$(5m - 6)(15m - 8) = 0$

$\therefore m = \frac{6}{5}, \frac{8}{15}$

$c = 4 + 5m = 4 + 5(\frac{8}{15}) = \frac{20}{3}$

Answers: $m = \frac{8}{15}$, $c = \frac{20}{3}$

Marking Scheme Notes

Question 5 (c) [Scale 5C (0, 2, 3, 5)]

2: • Effort at finding intercept on one or both axes
• Effort at inserting $(-5, 4)$ into $y = mx + c$

3: • Either c or m found