

## LC 2018: PAPER 2

### QUESTION 5 (25 MARKS)

#### Question 5 (a)

$$m: 2x + 3y + 1 = 0$$

$$A(-2, 1): 2(-2) + 3(1) + 1 = 0$$

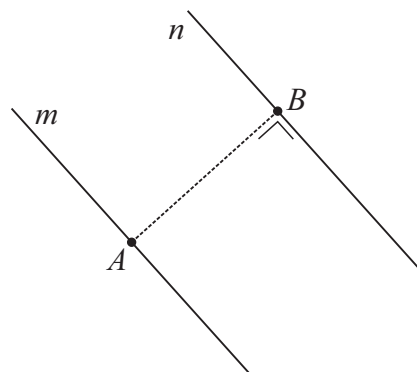
$$\therefore A(-2, 1) \in m$$

#### MARKING SCHEME NOTES

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

**3:** • Substitution for  $x$  or  $y$  in equation of line

**7:** • Substitution for  $x$  and  $y$  in eq. of line (LHS when no indication of 0)



#### Question 5 (b)

$$\text{Slope of } m = -\frac{2}{3}$$

$$\text{Slope of } AB: m_{\perp} = \frac{3}{2}$$

$$\text{Equation of } AB: (x_1, y_1) = A(-2, 1), m = \frac{3}{2}$$

$$y - 1 = \frac{3}{2}(x + 2)$$

$$2y - 2 = 3x + 6$$

$$AB: 3x - 2y + 8 = 0$$

$$AB \cap n = \{B\}$$

$$AB: 3x - 2y + 8 = 0 \dots (1)(\times 3)$$

$$n: 2x + 3y - 51 = 0 \dots (2)(\times 2)$$

$$9x - 6y + 24 = 0$$

$$4x + 6y - 102 = 0$$

$$\begin{array}{r} 13x \quad -78 = 0 \Rightarrow x = 6 \end{array}$$

$$\text{Into (1): } 3(6) - 2y + 8 = 0 \Rightarrow y = 13$$

$$\therefore B(6, 13)$$

#### MARKING SCHEME NOTES

**Question 5 (b) [Scale 10D (0, 3, 5, 8, 10)]**

**3:** • Slope of  $AB$   
• Equation of line formula with some substitution

**5:** • Equation of  $AB$

**8:** • Effort at finding intersection of lines

**Note:** Point of intersection, found correctly, of  $n$  and a relevant  $AB$  (with errors) merits Mid-Partial Credit at least

**Question 5 (c)**

$a = 1, b = 3; A(-2, 1), B(6, 13)$

$$D\left(\frac{1(6)+3(-2)}{1+3}, \frac{1(13)+3(1)}{1+3}\right) = D(0, 4)$$

Equation of  $s$ :

End points of diameter:  $A(-2, 1), D(0, 4)$

$$\text{Centre} = \left(\frac{-2+0}{2}, \frac{1+4}{2}\right) = \left(-1, \frac{5}{2}\right)$$

$$r = \frac{1}{2}\sqrt{(-2-0)^2 + (1-4)^2} = \frac{1}{2}\sqrt{13}$$

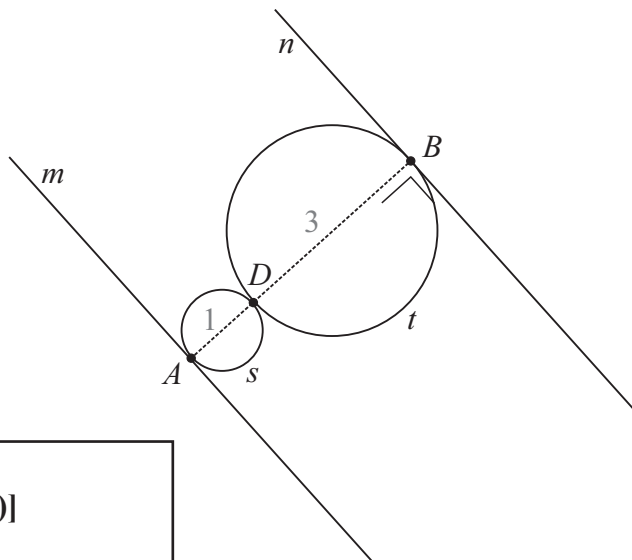
$$s: (x+1)^2 + \left(y - \frac{5}{2}\right)^2 = \left(\frac{1}{2}\sqrt{13}\right)^2$$

$$(x+1)^2 + \left(y - \frac{5}{2}\right)^2 = \frac{13}{4}$$

$$4(x+1)^2 + 4\left(y - \frac{5}{2}\right)^2 = 13$$

Point dividing  $[AB]$  in the ratio  $a:b$

$$\left(\frac{bx_1 + ax_2}{b+a}, \frac{by_1 + ay_2}{b+a}\right)$$



**MARKING SCHEME NOTES**

**Question 5 (c) [Scale 5C (0, 2, 4, 5)]**

- 2: • Some relevant use of 1:3  
 • Midpoint of  $AB$  found once but no further work of relevance  
 • Formula with some relevant substitution
- 4: • Centre and radius of circle