

C1 COORDINATE GEOMETRY

$$\textcircled{1} \text{ a) } 3x + 5y - 2 = 0$$

$$5y = 2 - 3x$$

$$y = \frac{2}{5} - \frac{3}{5}x$$

$$\text{gradient} = -\frac{3}{5}$$

$$\text{b) } L_1 \text{ gradient} = -\frac{3}{5}$$

$$\text{hence } L_2 \text{ gradient} = \frac{5}{3}$$

$$L_2 \quad y = \frac{5}{3}x + c$$

$$(3, 1)$$

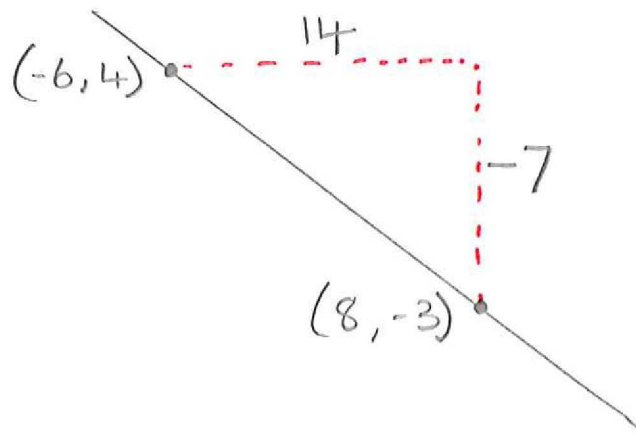
$$1 = \frac{5}{3}(3) + c$$

$$1 = 5 + c$$

$$c = -4$$

$$y = \frac{5}{3}x - 4$$

②



$$\begin{aligned}\text{gradient} &= \frac{-7}{14} \\ &= -\frac{1}{2}\end{aligned}$$

$$y = -\frac{1}{2}x + c$$

$$(8, -3)$$

$$-3 = -\frac{1}{2}(8) + c$$

$$-3 = -4 + c$$

$$1 = c$$

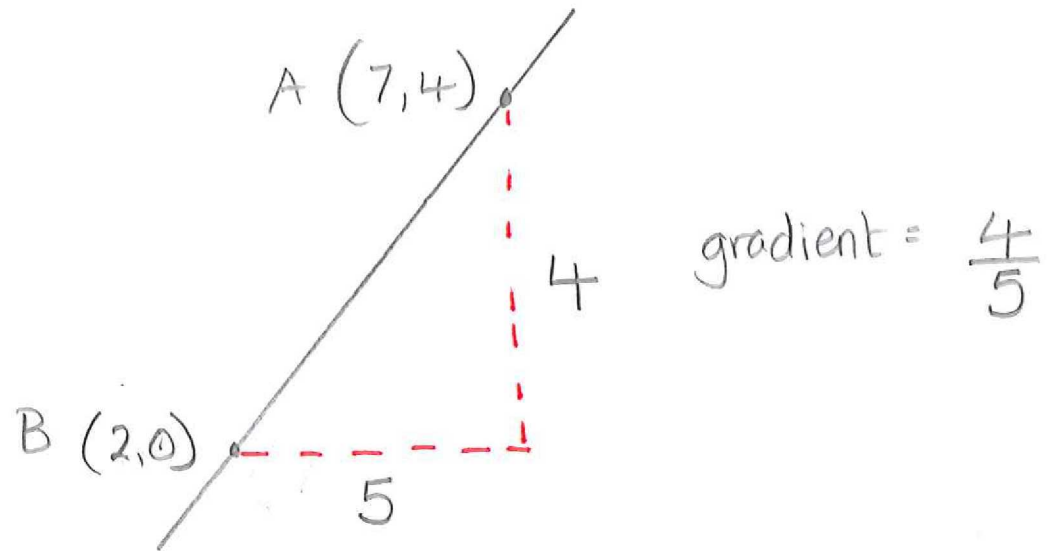
$$y = -\frac{1}{2}x + 1$$

(x2)

$$2y = -x + 2$$

$$2y + x - 2 = 0$$

③
a)



$$y = \frac{4}{5}x + c$$

$$(2, 0)$$

$$0 = \frac{4}{5}(2) + c$$

$$0 = \frac{8}{5} + c$$

$$c = -\frac{8}{5}$$

$$y = \frac{4}{5}x - \frac{8}{5}$$

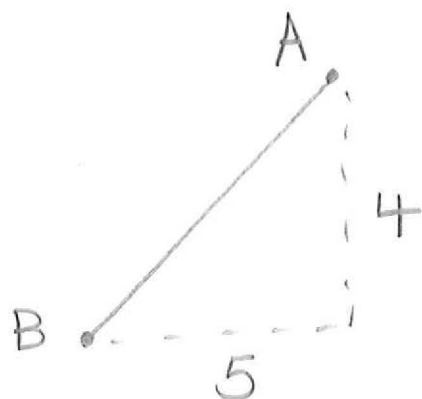
($\times 5$)

$$5y = 4x - 8$$

$$0 = 4x - 5y - 8$$

③

b)

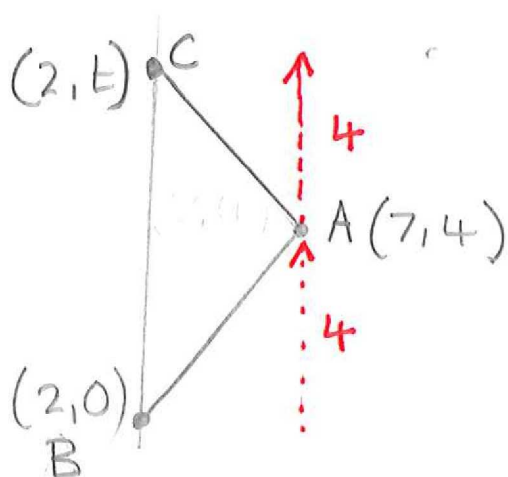


$$AB^2 = 5^2 + 4^2$$

$$AB^2 = 41$$

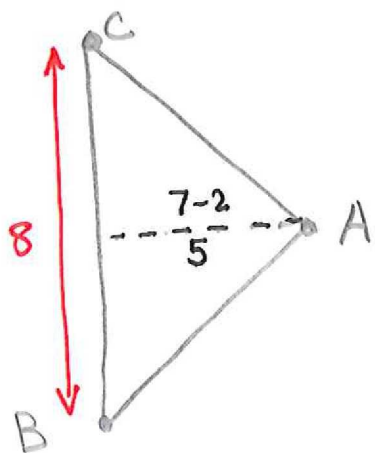
$$AB = \underline{\underline{\sqrt{41}}}$$

c)



$$\underline{\underline{(2, 8)}}$$

d)



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

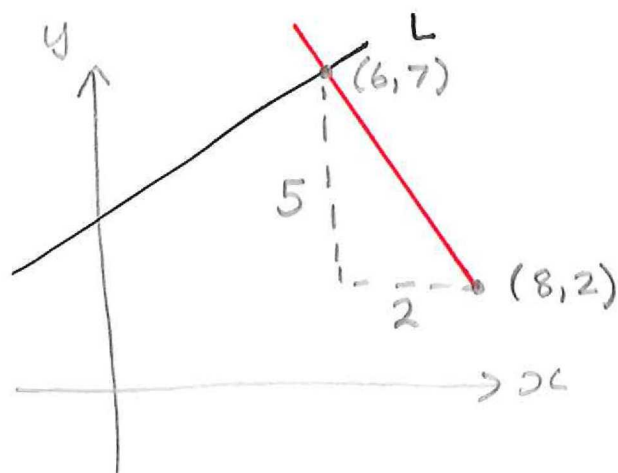
$$= 8 \times 7-2 \times \frac{1}{2}$$

$$= 8 \times 5 \times \frac{1}{2}$$

$$= \underline{\underline{20}}$$

④

a)



gradient = $-\frac{5}{2}$

L is perpendicular to the red line

hence L gradient = $+\frac{2}{5}$

$$y = +\frac{2}{5}x + c$$

$$(6, 7)$$

$$7 = +\frac{2}{5}(6) + c$$

$$7 = +\frac{12}{5} + c$$

$$c = 7 - \frac{12}{5} = \frac{35}{5} - \frac{12}{5} = \frac{23}{5}$$

$$y = -\frac{2}{5}x + \frac{23}{5}$$

($\times 5$)

$$5y = -2x + 23$$

$$0 = -2x - 5y + 23$$

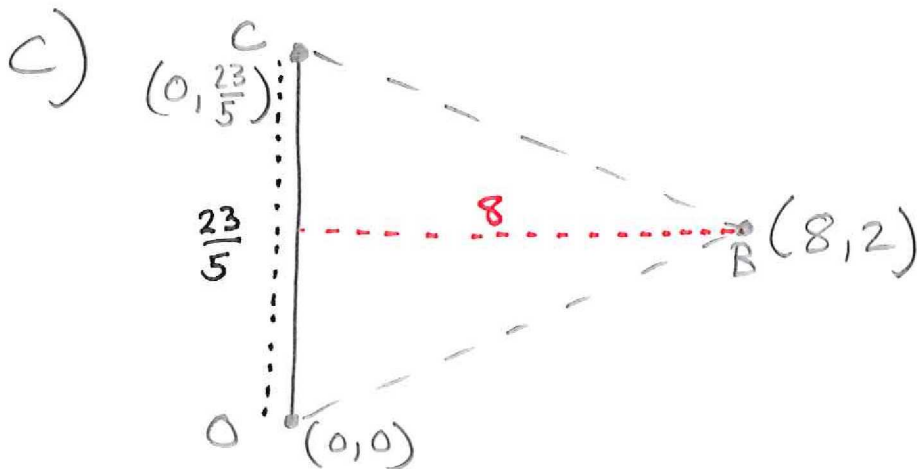
④

b) L $y = -\frac{2}{5}x + \frac{23}{5}$

C $(0, y)$

$$y = -\frac{2}{5}(0) + \frac{23}{5}$$

$$y = \frac{23}{5}$$



$$\text{Area} = \frac{23}{5} \times 8 \times \frac{1}{2}$$

$$= \frac{184}{10} = \underline{\underline{18.4}}$$

⑤

$$a) \quad L_2 \quad 3x + 2y - 8 = 0$$

$$2y = -3x + 8$$

$$y = -\frac{3}{2}x + 4$$

$$\text{gradient} = -\frac{3}{2}$$

b)

$$L_1 = L_2$$

$$3x + 2 = -\frac{3}{2}x + 4$$

($\times 2$)

$$6x + 4 = -3x + 8$$

$$9x = 4$$

$$x = \frac{4}{9}$$

$$y = 3x + 2$$

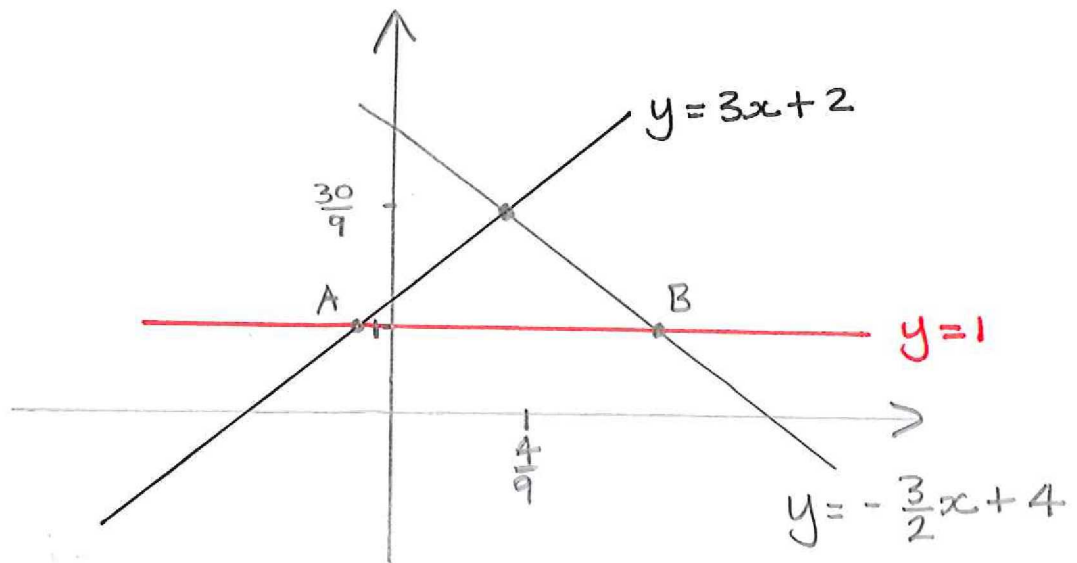
$$y = 3\left(\frac{4}{9}\right) + 2$$

$$y = \frac{12}{9} + 2$$

$$y = \frac{12}{9} + \frac{18}{9} = \frac{30}{9}$$

5

c)



A $1 = 3x + 2$

$$-1 = 3x$$

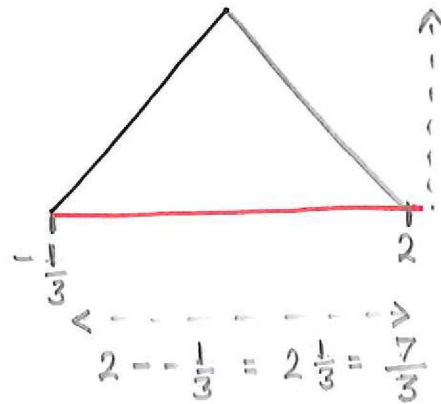
$$x = -\frac{1}{3}$$

B $1 = -\frac{3}{2}x + 4$

$$-3 = -\frac{3}{2}x$$

$$-6 = -3x$$

$$x = 2$$



$$\frac{30}{9} - 1 = \frac{30}{9} - \frac{9}{9} = \frac{21}{9}$$

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

$$= \frac{21}{9} \times \frac{7}{3} \times \frac{1}{2}$$

$$= \frac{147}{54} = \frac{49}{18}$$

⑥

a)

$$L_1 \quad y = \frac{3}{2}x - 2$$

$$(0, -2)$$

$$y = \frac{3}{2}(0) - 2$$

$$y = -2$$

$$P(0, -2)$$

$$Q(5, -3)$$

$$\text{midpoint} \left(\frac{0+5}{2}, \frac{-2+(-3)}{2} \right)$$

$$\left(\frac{5}{2}, -\frac{5}{2} \right)$$

b)

$$L_1 \quad y = \frac{3}{2}x - 2$$

$$L_2 \quad \text{gradient} \quad -\frac{2}{3}x$$

$$y = -\frac{2}{3}x + c$$

$$(5, -3)$$

$$-3 = -\frac{2}{3}(5) + c$$

$$-3 = -\frac{10}{3} + c$$

$$c = -3 + \frac{10}{3} = \frac{1}{3}$$

6

b) continued $l_2 \quad y = -\frac{2}{3}x + \frac{1}{3}$

(x3)

$$3y = -2x + 1$$

$$3y + 2x = 1$$

c)

$$l_1 = l_2$$

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

(x3)

$$\frac{9x}{2} - 6 = -2x + 1$$

(x2)

$$9x - 12 = -4x + 2$$

$$13x = 14$$

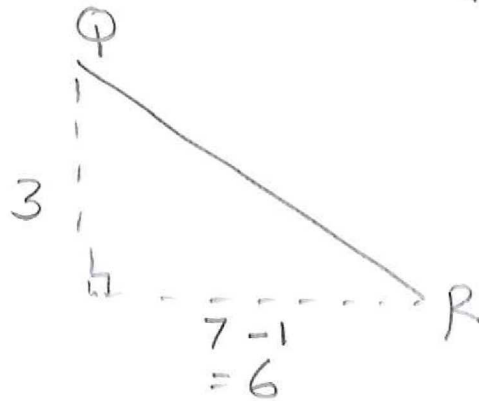
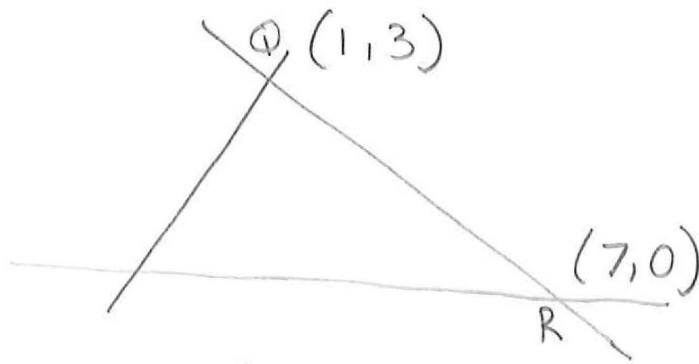
$$x = \frac{14}{13}$$

$$y = \frac{3}{2} \left(\frac{14}{13} \right) - 2$$

$$y = \frac{42}{26} - 2 = \frac{42}{26} - \frac{52}{26} = \frac{-10}{26}$$

7

a)



$$QR^2 = 3^2 + 6^2$$

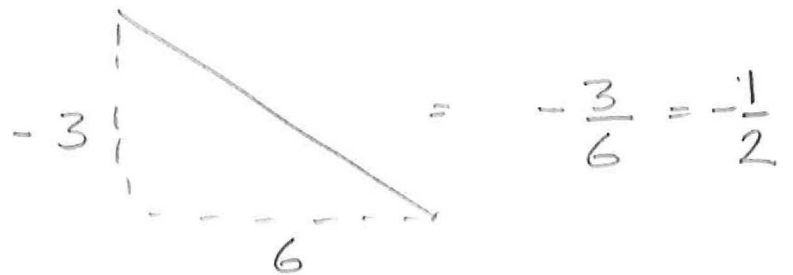
$$QR^2 = 45$$

$$\begin{aligned} QR &= \sqrt{45} \\ &= \sqrt{9 \cdot 5} \\ &= 3\sqrt{5} \end{aligned}$$

hence $a = 3$

b)

gradient of L_1



hence gradient of $L_2 = 2$

$$y = 2x + c$$

$$(1, 3)$$

$$3 = 2(1) + c$$

$$1 = c$$

$$y = 2x + 1$$

⑦

c)

$$L_2: y = 2x + 1$$

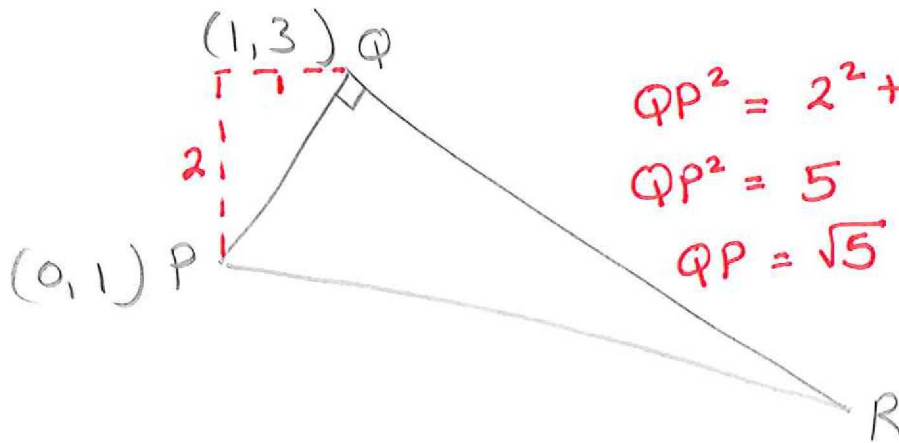
$$(0, y)$$

$$y = 2(0) + 1$$

$$y = 1$$

$$P(0, 1)$$

d)



$$QP^2 = 2^2 + 1^2$$

$$QP^2 = 5$$

$$QP = \sqrt{5}$$

$$QR = 3\sqrt{5}$$

$$PQ = \sqrt{5}$$

$$\text{Area} = 3\sqrt{5} \times \sqrt{5} \times \frac{1}{2}$$

$$= 15 \times \frac{1}{2}$$

$$= \underline{\underline{7.5}}$$