

Text + Test 4 Chapter 1 — Line

Ex 1.1

Q6 // Lines \Rightarrow same slopes

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

$$\begin{array}{cc} (-2, 0) & (4, 3) & & (1, -1) & (k, 1) \\ \frac{3-0}{4-2} & & = & \frac{1+1}{k-1} \end{array}$$

$$\frac{3}{2} = \frac{2}{k-1}$$

$$k-1 = 4$$

$$k = 5$$

Q7 $(-1, 1)$ $(-p, 13)$ slope = 2

$$\frac{13-1}{-p+1} = 2$$

$$12 = -2p + 2$$

$$2p = -10$$

$$p = -5$$

Q8 $A(-2, 3)$ $B(2, 5)$ $C(4, 1)$

$$(i) \text{ Slope } AB = \frac{5-3}{2-(-2)} = \frac{2}{4} = \frac{1}{2}$$

$$\text{Slope } BC = \frac{1-5}{4-2} = \frac{-4}{2} = -2$$

$$\text{Slope } CA = \frac{1-3}{4-(-2)} = \frac{-2}{6} = -\frac{1}{3}$$

(ii) Right Angled $\Delta \Rightarrow$ 2 perpendicular lines

$$AB \perp BC \text{ as } \frac{1}{2} \times -2 = -1$$

\therefore Is right angled.

Q10 slope a = $\frac{\text{rise}}{\text{run}} = \frac{2}{3}$

Slope b = $\frac{3}{2}$

Slope c = $\frac{4}{2} = 2$

Q12 P(a, 4) Q(2, 3) R(3, -1) S(-2, 4)

$|PQ| = |RS|$ distance

$\sqrt{(2-a)^2 + (3-4)^2} = \sqrt{(-2-3)^2 + (4+1)^2}$ sq both sides

$\sqrt{(2-a)^2 + (-1)^2} = \sqrt{(-5)^2 + (5)^2}$

$4 - 4a + a^2 + 1 = 25 + 25$

$a^2 - 4a - 45 = 0$

$(a - 9)(a + 5) = 0$

$a = 9 \quad a = -5$

Q13 P(5, 6) Q(k, 2) R(9, -1) PQ \perp QR

m_{PQ} = $\frac{2-6}{k-5} = \frac{-4}{k-5}$ m_{QR} = $\frac{-1-2}{9-k} = \frac{-3}{9-k}$

$\frac{-4}{k-5} \times \frac{-3}{9-k} = -2$

$\frac{12}{9k - k^2 - 45 + 5k} = -2$

$\frac{12}{-k^2 + 14k - 45} = -1(-k^2 + 14k - 45)$

$12 = k^2 - 14k + 45$

$0 = k^2 - 14k + 33$

$(k - 11)(k - 3)$

k = 3 k = 11

Q14 (i) Slope $AB = \frac{2+2}{7+1} = \frac{4}{8} = \frac{1}{2}$

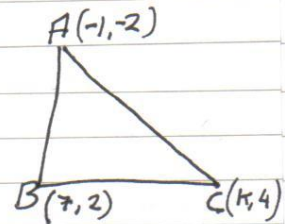
(ii) Slope $BC = \frac{4-2}{k-7} = \frac{2}{k-7}$

$$\frac{2}{k-7} = -2$$

$$2 = -2k + 14$$

$$2k = 12$$

$$k = 6$$



(iii) $|AB| = \sqrt{(7+1)^2 + (2+2)^2}$
 $= \sqrt{64+16}$
 $= \sqrt{80}$
 $= 4\sqrt{5} \quad \Rightarrow P=4$

(iv) $|BC| = \sqrt{(6-7)^2 + (4-2)^2}$
 $= \sqrt{1+4}$
 $= \sqrt{5}$

Area = $\frac{1}{2}$ base \times h

$$\frac{\sqrt{5}}{2} \times 4\sqrt{5} = 2(\sqrt{5})^2 = 2(5) = 10 \text{ sq units}$$

$$\begin{aligned} \text{Q15 (i) } |PQ| &= \sqrt{(q+2)^2 + (0-2)^2} \\ &= \sqrt{q^2 + 4q + 4 + 4} \\ &= \sqrt{q^2 + 4q + 8} \end{aligned}$$

$$\begin{aligned} |QR| &= \sqrt{(5-q)^2 + (3-0)^2} \\ &= \sqrt{25 - 10q + q^2 + 9} \\ &= \sqrt{q^2 - 10q + 34} \end{aligned}$$

$$|PQ| = 2|QR|$$

$$\sqrt{q^2 + 4q + 8} = 2\sqrt{q^2 - 10q + 34} \quad \text{sq both sides}$$

$$q^2 + 4q + 8 = 4(q^2 - 10q + 34)$$

$$q^2 + 4q + 8 = 4q^2 - 40q + 136$$

$$3q^2 - 44q + 128 = 0$$

$$(3q - 32)(q - 4) = 0$$

$$q = \frac{32}{3} \quad q = 4$$

$$(ii) \quad P(-2, 2) \quad Q(4, 0) \quad R(5, 3)$$

$$m_{PQ} = \frac{0-2}{4+2} = \frac{-2}{6} = -\frac{1}{3}$$

$$m_{QR} = \frac{3-0}{5-4} = \frac{3}{1} = 3$$

$$-\frac{1}{3} \times 3 = -1 \quad \therefore \Delta PQR \text{ is Right Angled.}$$