

Straight Line Graphs – Section Test

(Answers)

1.

Line 1 can be written as

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

Line 2 can be written as

$$y = \frac{3}{4}x - \frac{1}{4}$$

Line 3 can be written as

$$y = -\frac{3}{4}x + \frac{7}{4}$$

Line 4 can be written as

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

Lines 1 and 3 are perpendicular, since $\frac{4}{3} \times -\frac{3}{4} = -1$.

Lines 2 and 4 are perpendicular, since $\frac{3}{4} \times -\frac{4}{3} = -1$

2.

$$= \sqrt{(4 - (-3))^2 + (-2 - (-5))^2}$$

$$= \sqrt{7^2 + 3^2}$$

$$= \sqrt{49 + 9}$$

$$\text{Length PQ} = \sqrt{58}$$

3.

$$\text{The midpoint of PQ is } \left(\frac{4 + (-3)}{2}, \frac{-2 + (-5)}{2} \right) = (0.5, -3.5)$$

4.

S is $\frac{3}{5}$ of the distance from P to Q

Distance between x-coordinates of P and Q = $-3 - 4 = -7$

$$\text{x-coordinate of S} = 4 + \frac{3}{5} \times -7 = 4 - 4.2 = -0.2$$

Distance between y-coordinates of P and Q = $-5 - (-2) = -3$

$$\text{y-coordinate of S} = -2 + \frac{3}{5} \times -3 = -2 - 1.8 = -3.8$$

S is the point $(-0.2, -3.8)$

5.

$$R = \left(\frac{3+(-1)}{2}, \frac{5+9}{2} \right) = (1, 7)$$

R lies on the line $y = x + 6$

6.

Distance in x-direction between A and B = $7 - 1 = 6$

x-coordinate of C = $1 + \frac{3}{8} \times 6 = 1 + 2.25 = 3.25$

Distance in y-direction between A and B = $-4 - 4 = -10$

y-coordinate of C = $4 + \frac{3}{8} \times -10 = 4 - 3.75 = 0.25$

The coordinates of C are (3.25, 0.25)

7.

Parallel lines have the same gradient, so line is of the form

$$2y + 3x = k$$

$$2 \times -1 + 3 \times 2 = k$$

$$-2 + 6 = k$$

$$k = 4$$

Line passes through (2, -1), so

The equation of the line is:

$$2y + 3x = 4$$

8.

$$3y = x - 1$$

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

Gradient of line

so gradient of perpendicular line is -3

Equation of line is

$$y = -3x + c$$

$$3 = -3 \times 1 + c$$

$$3 = -3 + c$$

$$c = 6$$

Line passes through (1, 3), so

Equation of line is:

$$y = -3x + 6$$

9.

$$\text{Gradient AB} = \frac{6 - (-2)}{3 - 5} = \frac{8}{-2} = -4$$

$$\text{Gradient of perpendicular bisector} = \frac{1}{4}$$

Midpoint of AB

$$= \left(\frac{5+3}{2}, \frac{-2+6}{2} \right) = (4, 2)$$

$$y - 2 = \frac{1}{4}(x - 4)$$

$$4y - 8 = x - 4$$

Equation of perpendicular bisector is $4y = x + 4$

10.

$$\text{Length AB} = \sqrt{(4-1)^2 + (7-5)^2} = \sqrt{9+4} = \sqrt{13}$$

$$\text{Length BC} = \sqrt{(4-5)^2 + (7-2)^2} = \sqrt{1+25} = \sqrt{26}$$

$$\text{Length AC} = \sqrt{(5-1)^2 + (2-5)^2} = \sqrt{16+9} = \sqrt{25}$$

The sides are all different lengths.

$$\text{Gradient AB} = \frac{7-5}{4-1} = \frac{2}{3}$$

$$\text{Gradient BC} = \frac{7-2}{4-5} = \frac{5}{-1} = -5$$

$$\text{Gradient AC} = \frac{2-5}{5-1} = \frac{-3}{4} = -\frac{3}{4}$$

None of the lines are perpendicular, so there is no right-angle.

The triangle is scalene with no right-angle.