



CHAPTER 5: THE STRAIGHT LINE



Cloned SPM Question (2006, Paper 1)

The coordinates of point R are $(-2, 3)$ and the gradient of the straight line RS is 2. The coordinates of point S could be

- A $(2, -2)$
- B $(2, 0)$
- C $(2, 9)$
- D $(2, 11)$

Solution

Let the coordinates of point S be (x, y) .

Therefore, gradient of $RS = 2$

$$\begin{aligned}\Rightarrow \frac{y-3}{x+2} &= 2 \\ y-3 &= 2x+4 \\ y &= 2x+7\end{aligned}$$

From the options, **A**, **B**, **C** and **D**, $x = 2$

Thus, $y = 2(2) + 7$
 $y = 11$

Coordinates of $S = (2, 11)$

Answer: D

Pointers

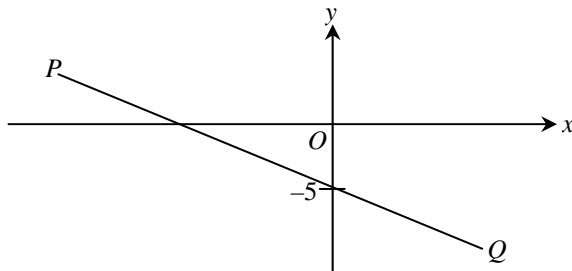
- The coordinates of two points and the gradient are involved. So, use the formula

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

- In all the options, **A**, **B**, **C** and **D**, x -coordinate = 2. So, substitute $x = 2$ into $y = 2x + 7$ to find the corresponding value of y .

 **Cloned SPM Question (2006, Paper 1)**

The diagram shows a straight line PQ with a gradient of $-\frac{1}{2}$.



Find the x -intercept of the straight line PQ .

- A $-\frac{2}{5}$
- B $-\frac{5}{2}$
- C -5
- D -10

Solution

Gradient of $PQ = -\frac{1}{2}$ and y -intercept $= -5$

Thus,

$$-\left(\frac{-5}{x\text{-intercept}}\right) = -\frac{1}{2}$$
$$x\text{-intercept} = 5(-2)$$
$$= -10$$

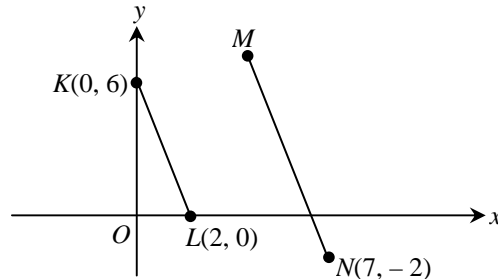
Answer: D

Pointers

- The question is about intercepts and gradient. So, use the formula $m = -\frac{y\text{-intercept}}{x\text{-intercept}}$.

 **Cloned SPM Question (2006, Paper 2)**

The diagram shows a straight line KL and a straight line MN drawn on a Cartesian plane. KL is parallel to MN .



Find

- the equation of the straight line MN ,
- the x -intercept of the straight line MN .

Solution

$$\begin{aligned} \text{(a) Gradient of } MN &= \text{Gradient of } KL \\ &= \frac{6-0}{0-2} \\ &= -3 \end{aligned}$$

The straight line MN passes through point $N(7, -2)$.

Substitute $x = 7$, $y = -2$ and $m = -3$ into $y = mx + c$.

$$\begin{aligned} -2 &= -3(7) + c \\ c &= 21 - 2 \\ &= 19 \end{aligned}$$

Thus, the equation of the straight line MN is $y = -3x + 19$.

$$\begin{aligned} \text{(b) When } y = 0, \quad 0 &= -3x + 19 \\ 3x &= 19 \\ x &= \frac{19}{3} \end{aligned}$$

Thus, the x -intercept of the straight line MN is $\frac{19}{3}$.

Pointers

- (a) The straight line KL passes through two known points. So, find its gradient by using

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

MN is parallel to KL . So, they have the same gradient.

For MN , its gradient and one point on the line are known. So, use $y = mx + c$ to find c .

Remember to write $y = -3x + 19$ to earn full marks.

- (b) Substitute $y = 0$ into $y = -3x + 19$ to find the x -intercept.