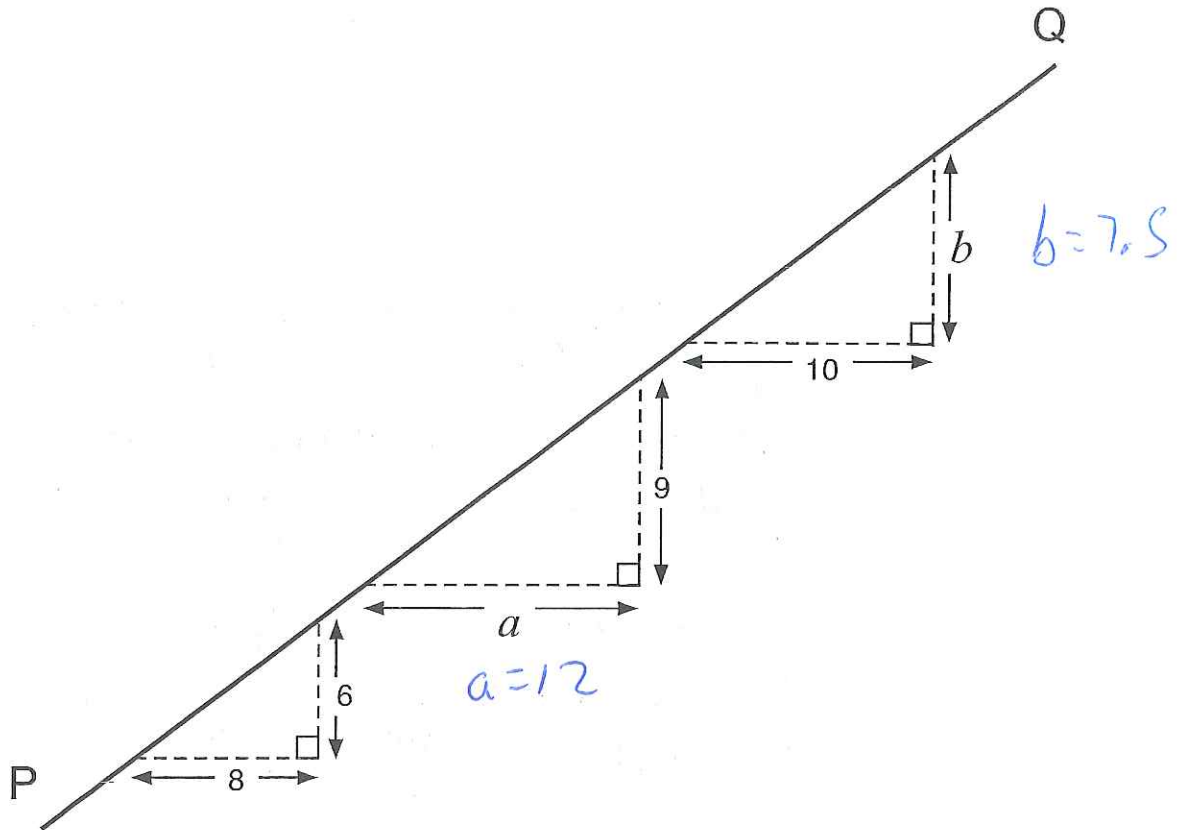


key

Lines, Slopes and Equations

1. Line PQ is a straight line.
Three similar right-angled triangles have been drawn beneath this line.
They have not been drawn to scale.



Calculate the lengths marked a and b .
Show all your reasoning in the space provided.

$$\frac{6}{8} = \frac{3}{4}$$

$$\frac{3}{4} = \frac{9}{a}$$

$$3a = 36$$

$$a = 12$$

$$\frac{3}{4} = \frac{b}{10}$$

$$4b = 30$$

$$b = 7.5$$

I set up a
proportion to
find out each
missing length.

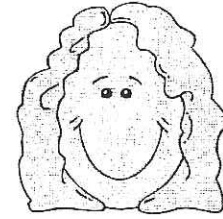
2. Joseph and Catherine are trying to decide whether or not the three points (2,1), (5,7) and (11,18) lie on a straight line.



Joseph

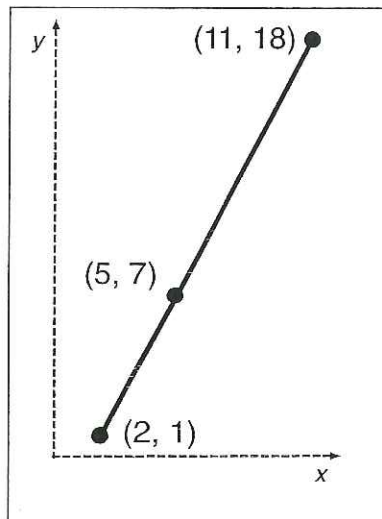
I quickly plotted the points and I think they lie on a straight line.

I disagree. I don't think the points lie in a straight line. It looks straight, but it might not be. You never can tell from drawings.



Catherine

Without drawing, decide whether or not the three points lie on a straight line. Show all your reasoning.



No they are not on a straight line. From $y=1$ to $y=7$ that is increase of 6. And from $x=2$ to $x=5$ that is an increase of 3. This means $\frac{\uparrow 6}{\rightarrow 3} = \frac{\uparrow 2}{\rightarrow 1}$. From point (5,7) to (11,18) it's an increase of $\frac{\uparrow 11}{\rightarrow 6} \neq \frac{\uparrow 2}{\rightarrow 1}$.

3. If the straight line that passes through (2,1) and (5, 7) is drawn accurately, it passes through the point (20, y). What number does y stand for?

$\frac{\uparrow 6}{\rightarrow 3} = \frac{\uparrow 2}{\rightarrow 1}$ From $x=5$ to $x=20$ that's an increase of 15 so $y = 15 \cdot 2 + 7 = \boxed{37}$

The point (x, 21) lies on the same line. What number does x stand for?

From $y=7$ to $y=21$ that's an increase of 14 so $x = \frac{14}{2} + 5 = \boxed{12}$

What is the equation of the straight line that passes through (2,1) and (5, 7)?

$\boxed{y = 2x + 3}$