The equation of a line

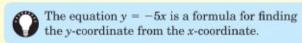
- It is possible to give an instruction for finding the y-coordinate from the x-coordinate of any point on a line.
- This instruction can be given as a formula in the form y = ...

The formula that gives the y-coordinate of a point on the line in terms of the x-coordinate is called the equation of a straight line.

Worked example _

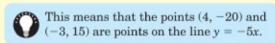
 \rightarrow Find the y-coordinate of the point on the line y = -5x whose x-coordinate is 4.

When
$$x = 4$$
, $y = -5x$ gives
 $y = -5 \times 4 = -20$



 \rightarrow Find the y-coordinate of the point on the line y = -5x whose x-coordinate is -3.

When
$$x = -3$$
, $y = -5x$ gives $y = (-5) \times (-3) = 15$



Find the *y*-coordinates of points on the line y = x which have x-coordinates of

- a 2
- c 7

- d 12

2 Find the y-coordinates of points on the line y = −x which have x-coordinates of

a 4

i.e.

- e 6.1

- b 2
- **d** $-4\frac{1}{2}$ **f** -8.3

Worked example

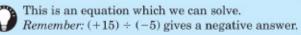
 \rightarrow Find the x-coordinate of the point on the line y = -5x whose y-coordinate is 15.

When
$$y = 15$$
, $y = -5x$ gives

$$15 = -5x$$

$$-3 = x$$

x = -3



3	Find the <i>x</i> -coordinates of points on the line $y = -x$ which have
	v-coordinates of

7

b -2

 $c 5\frac{1}{2}$

d -4.2

4 Find the y-coordinates of points on the line y = 2x which have x-coordinates of

a

b -4 **c** $3\frac{1}{2}$ **d** -2.6

5 Find the x-coordinates of points on the line y = -3x which have y-coordinates of

a 3

6 Find the y-coordinates of points on the line $y = \frac{1}{2}x$ which have x-coordinates of

a 6

b −12

d - 8.2

7 If the points (-1, a), (b, 15) and (c, -20) lie on the straight line with equation y = 5x, find the values of a, b and c.

8 If the points (3, a), (-12, b) and (c, -12) lie on the straight line with equation $y = -\frac{2x}{3}$, find the values of a, b and c.

9 Using squared paper and 1 square to 1 unit on each axis, plot the points (-2, -6), (1, 3), (3, 9) and (4, 12). What is the equation of the straight line which passes through these points?

- 10 Using squared paper and 1 square to 1 unit on each axis, plot the points (-3, 6), (-2, 4), (1, -2) and (3, -6). What is the equation of the straight line which passes through these points?
- 11 Using the same scale on each axis, plot the points (-6, -4), (-3, -2), (6, 4) and (12, 8). What is the equation of the straight line which passes through these points?
- 12 Which of the points (-2, -4), (2.5, 4), (6, 12) and (7.5, 10) lie on the line y = 2x?
- **13** Which of the points (-5, -15), (-2, 6), (1, -3) and (8, -24) lie on the line y = -3x?
- **14** Which of the points (2, 2), (-2, 1), (3, 0), (-4.2, -2), (-6.4, -3.2)lie
 - above the line $y = -\frac{1}{2}x$
 - **b** below the line $y = -\frac{1}{2}x$?