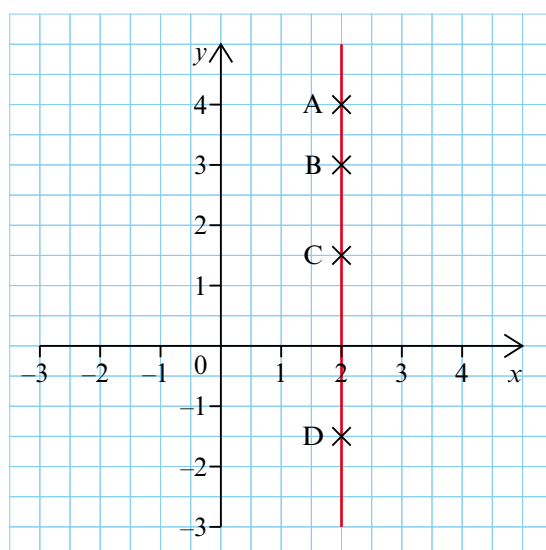# Functions and graphs

- Plotting and drawing the graph of an equation
- Recognising the graph of an equation

Keywords
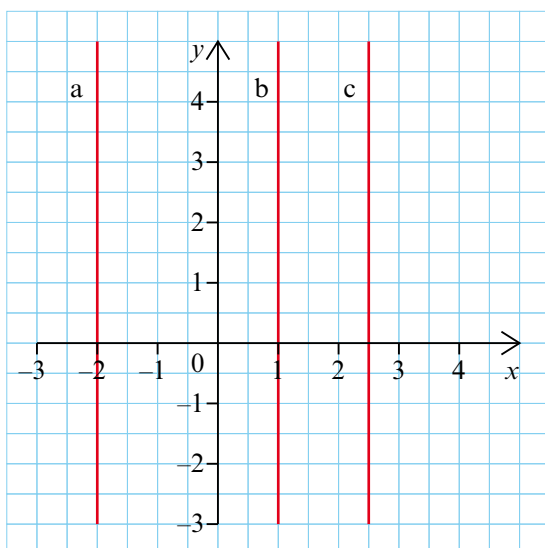
You should know

explanation 1
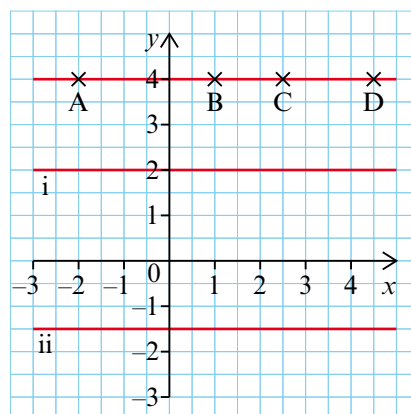
1 **a** Write down the coordinates of the points A, B, C and D.

b Describe in words what the coordinates have in common.

c What is the equation of the line?

2 Write down the equation of the lines a, b and c.

3 a Write the coordinates of A, B, C and D.

b Write the equation of the line containing the labelled points.

**c** Write the equations of lines i and ii.

4 a Write down the equations of lines i and ii.

b What are the coordinates of the point where the lines intersect?

c Write the coordinates of the points where these pairs of lines intersect.

  i $x = 7$ and $y = 3$

  ii $x = -2$ and $y = 4$

  iii $x = 3.5$ and $y = -1$

  iv $x = -1.5$ and $y = -9$
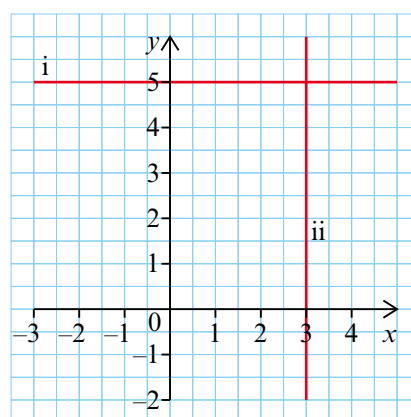
explanation 2a   explanation 2b

5 a Copy these axes and draw the line $y = x$. Write the equation next to the line.

b Copy and complete the table for the equation $y = x + 1$.

x	−4	−3	−2	−1	0	1	2	3
y	−3							

c Plot the x, y pairs from the table as coordinates.

d Draw the line $y = x + 1$ through your plotted points. Write the equation next to the line.

e Compare the line $y = x + 1$ to the line $y = x$.
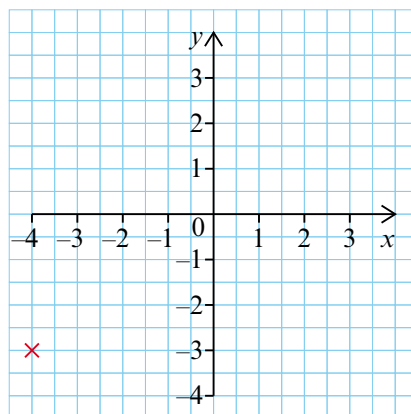
Your plotted points should lie on a straight line.

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6 a Copy and complete these coordinates of points on the line
$y = x + 2$.

    i $(-4, \square)$ **ii** $(0, \square)$ **iii** $(2, \square)$

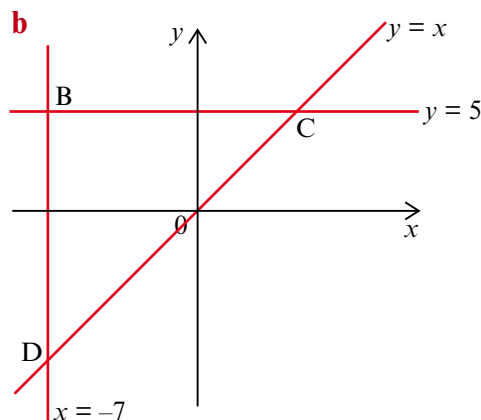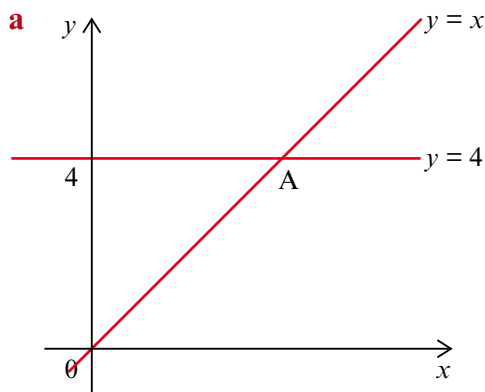 **b** Plot the points on the diagram used for question **5**.

  c Draw and label the line $y = x + 2$.

  d Draw and label the line $y = x + 3$.

  e Draw and label the line $y = x - 1$.

> explanation 3

7 Find the coordinates of A, B, C and D in these sketches.

8 Sketch the graphs of $y = x - 2$, $x = 3$ and $y = 5$ on the same diagram.

Find the coordinates of the points of intersection of these lines.

  a $y = x - 2$ and $x = 3$ **b** $x = 3$ and $y = 5$ **c** $y = x - 2$ and $y = 5$

9 Find the coordinates of the points where the following lines intersect.
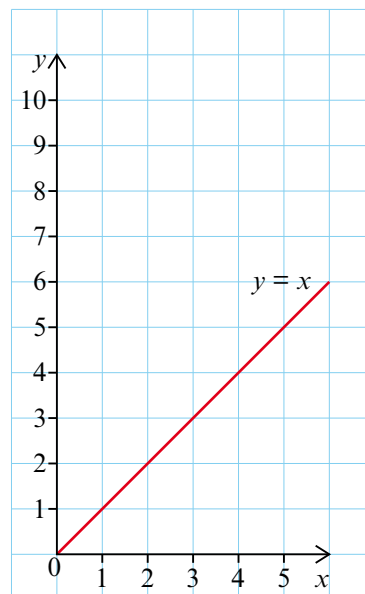
  a $x = 3$ and $y = x$ **b** $x = -2$ and $y = x$

  c $y = 5$ and $y = x$ **d** $y = x$ and $y = -4$

  e $y = x + 1$ and $x = 3$ **f** $y = x - 4$ and $x = -2$

> You may find it helpful to sketch the graphs.

10 **a** Copy and complete the table for the equation $y = 2x$.

x	0	1	2	3	4	5
y	0					

b Plot the values from your table as coordinates on a copy of the axes shown.

c Draw and label the line $y = 2x$.

d Which point do the lines $y = x$ and $y = 2x$ have in common?

11 **a** Explain why any line of the form $y = mx$, where m is a fixed number, must pass through the origin.

b Find the value of y when $x = 2$ for each of these equations.

   i $y = 3x$ **ii** $y = 4x$ **iii** $y = 5x$ **iv** $y = \frac{1}{2}x$

c Add the graphs of the equations in part **b** to the diagram from question **10**. Label each graph with its equation.

d Describe how changing the value of m affects the graph of $y = mx$.

**12** **a** Copy and complete the table for the equation $y = 2x + 3$.

x	0	1	2	3	4
y	3				

b Draw the line $y = 2x + 3$.

c Write down the coordinates of the point where the line crosses

   i the x-axis   **ii** the y-axis

13 a Copy and complete the table for the equation $y = 5 - x$.

x	-2	-1	0	1	2	3
y	7					

b Plot the values from your table as coordinates on a copy of the axes shown.

c Draw and label the line $y = 5 - x$.

d Write the coordinates of the points where the line crosses each axis.
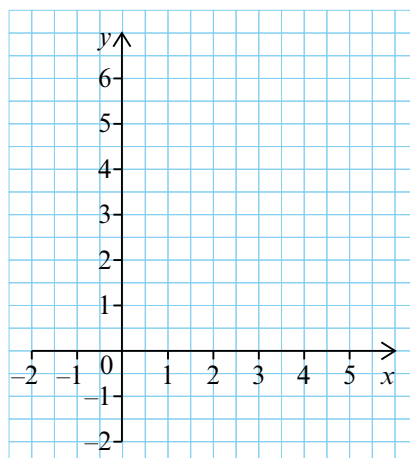
14 a Copy and complete the following coordinates of points on the line $y = 4 - x$.

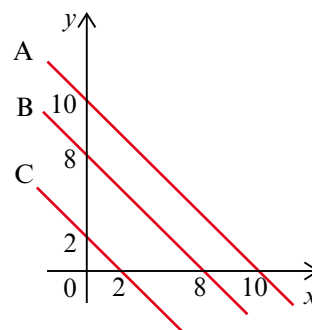**i** $(-2, \square)$ **ii** $(1, \square)$ **iii** $(5, \square)$

b Plot the points on the diagram used for question **13**.

c Draw and label the line $y = 4 - x$.

d Write the coordinates of the points where the line crosses each axis.

15 a Write the equation of each of the labelled lines.

b Copy the diagram and add a sketch of the line $y = x$.

c Write the coordinates of the points where the line $y = x$ crosses each line.

16 Here are some equations.

$y = x$

$x = -2$

$y = 4$

$y = 2 - x$

$y = x + 1$

Match each pair of points to an equation.

a A and B   **b** A and E

c B and D   **d** E and C

e A and D