



- 1 Complete the table of values for $y = x^3 - 2$

x	-2	-1	0	1	2
y	-10		-2		6

(2 marks)

When $x = -1$: $y = (-1)^3 - 2 = -1 - 2 = -3$

When $x = 1$: $y = 1^3 - 2 = 1 - 2 = -1$

- 2 Here are four equations.

A $y = 3x + 2$ B $y = x^2$ C $y = \frac{4}{x}$ D $y = x^3$

a. Write down the letter of the equation whose graph is a reciprocal curve.

b. Write down the letter of the equation whose graph is a straight line.

(2 marks)

a) A reciprocal graph has the form $y = \frac{k}{x}$, so the answer is C

b) A straight line has the form $y = mx + c$, so the answer is A

- 3 Here are four equations.

A $y = 2x + 1$ B $y = \frac{5}{x}$ C $y = x^3$ D $y = x^2 - 4$

Write down the letter of the equation whose graph

a. is a curve with two separate branches,

b. is an S-shaped curve that passes through the origin,

c. is a straight line.

(3 marks)

a)

$y = 5/x$ is a reciprocal, two branches

B

b)

$y = x^3$ is S-shaped, (0, 0) is on it

C

c)

$y = 2x + 1$ is linear

A

4

A graph has equation $y = x^3$

- Work out the value of y when $x = -3$.
- Does the point $(-2, 8)$ lie on the graph? You must show how you get your answer.
- Work out the value of x when $y = 64$.

(3 marks)

a)

$$(-3)^3 = -3 \times -3 \times -3$$

$$= 9 \times -3$$

$$y = -27$$

b)

$$x = -2: y = (-2)^3 = -8$$

-8 is not 8

$$\text{No}$$

c)

$$x^3 = 64$$

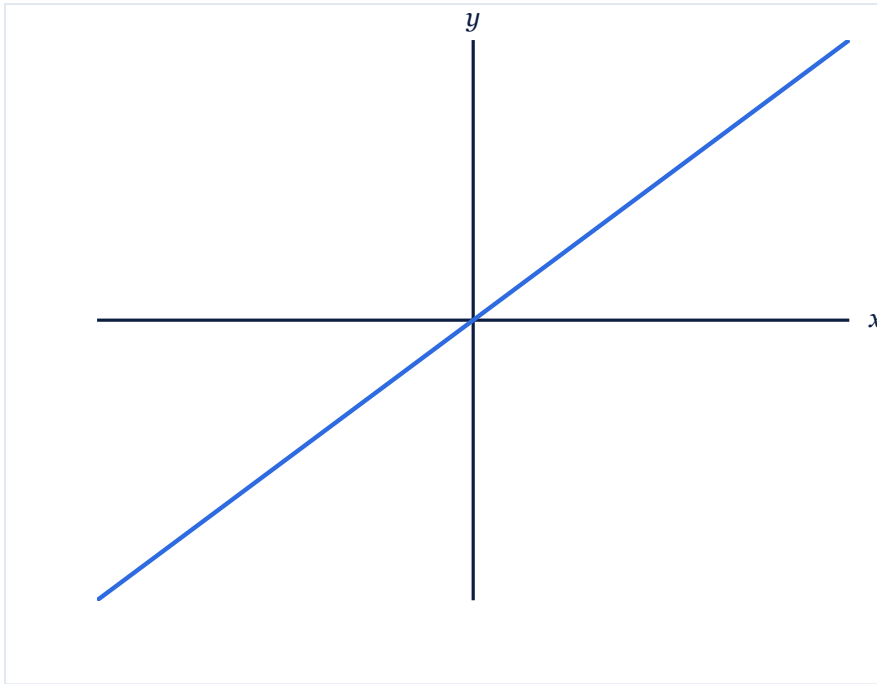
$$4 \times 4 \times 4 = 64$$

$$x = 4$$

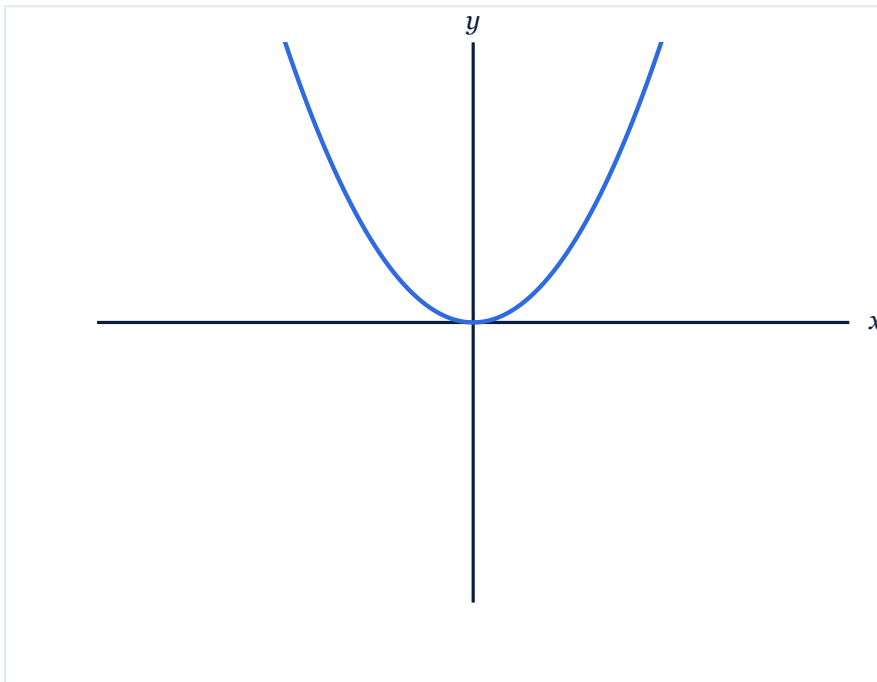
5

The diagram shows four sketch graphs, labelled **A**, **B**, **C** and **D**.

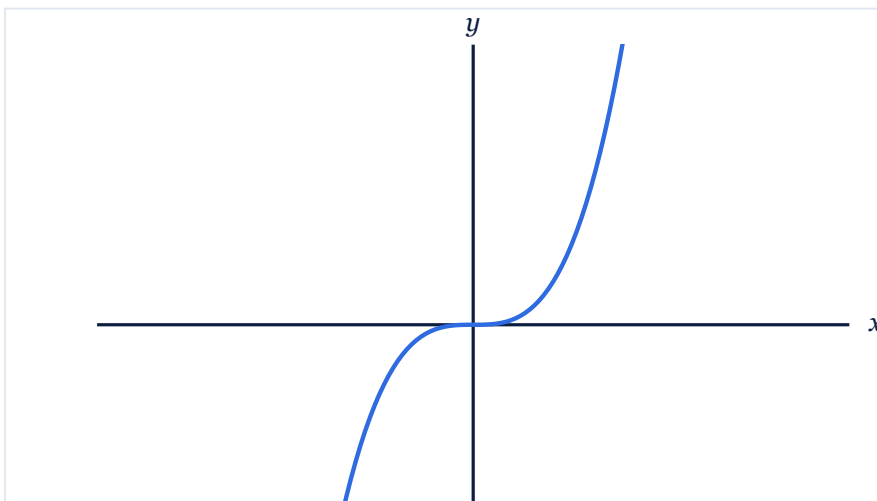
- a. Write down the letter of the graph of $y = x^3$
- b. Write down the letter of the graph of $y = \frac{2}{x}$



A



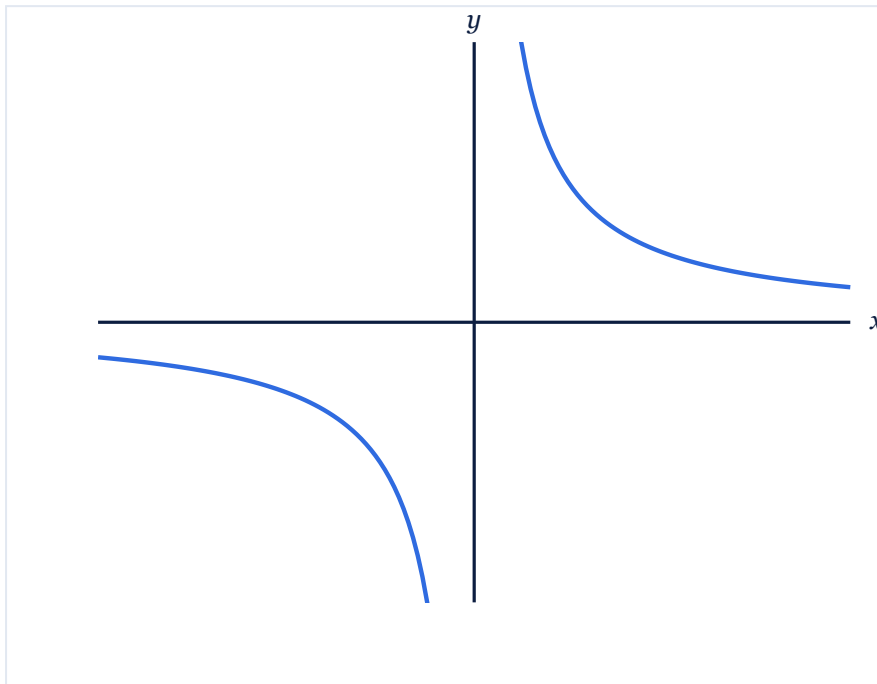
B



(2 marks)



C



D

a) The graph of $y = x^3$ is an S-shaped curve through the origin: graph C. For example, $x = -1, 0$ and 1 give $y = -1, 0$ and 1

b) For $y = 2/x$, x cannot be zero and y never equals zero. Positive x gives positive y , and negative x gives negative y , so the two branches approach the axes without touching them: graph D

6

Complete the table of values for $y = \frac{12}{x}$

x	1	2	3	4	6	12
y	12		4		2	

(2 marks)

$$\text{When } x = 2: y = \frac{12}{2} = 6$$

$$\text{When } x = 4: y = \frac{12}{4} = 3$$

$$\text{When } x = 12: y = \frac{12}{12} = 1$$

7

The graph of $y = x^3$ is drawn for all values of x .

- Write down the coordinates of the point where the graph crosses the x -axis.
- Is y positive or negative when x is a large negative number such as -100 ? Give a reason.
- Describe the shape of the graph as x goes from large negative values to large positive values.

(3 marks)

a)

$$y = 0 \text{ so } x^3 = 0$$

$(0, 0)$

b)

$$(-100)^3 = -1\,000\,000$$

negative

c)

S-shaped curve, bottom left to top right

8

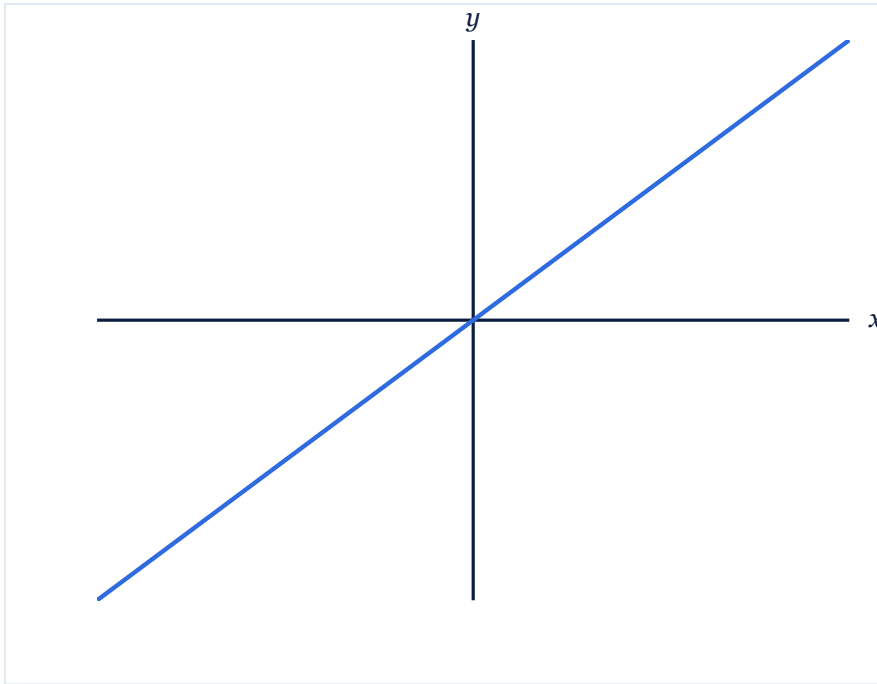
The diagram shows five sketch graphs, labelled **A**, **B**, **C**, **D** and **E**.

Match each equation below to the letter of its graph.

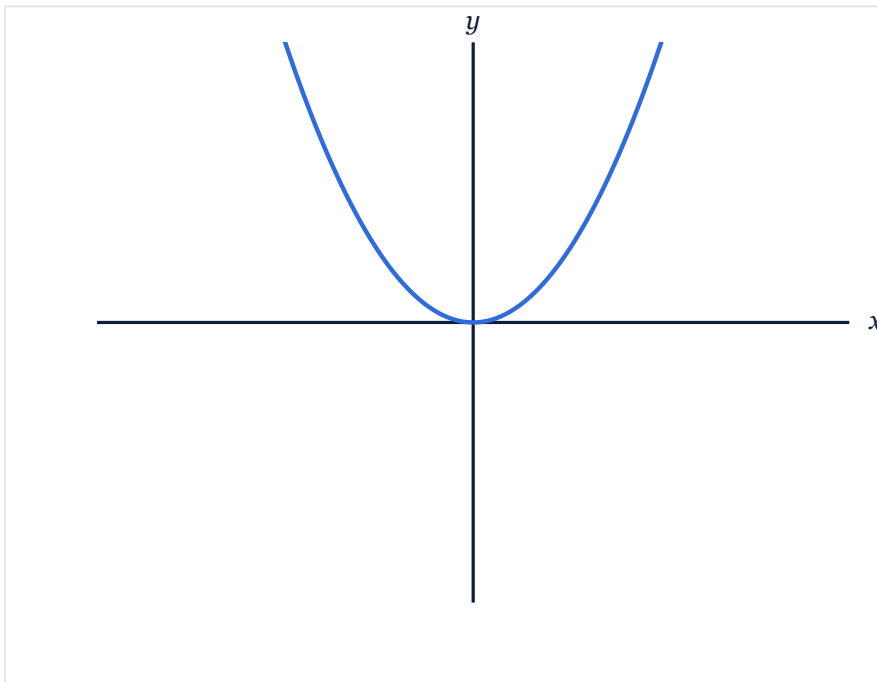
a. $y = -x^2$

b. $y = x^3$

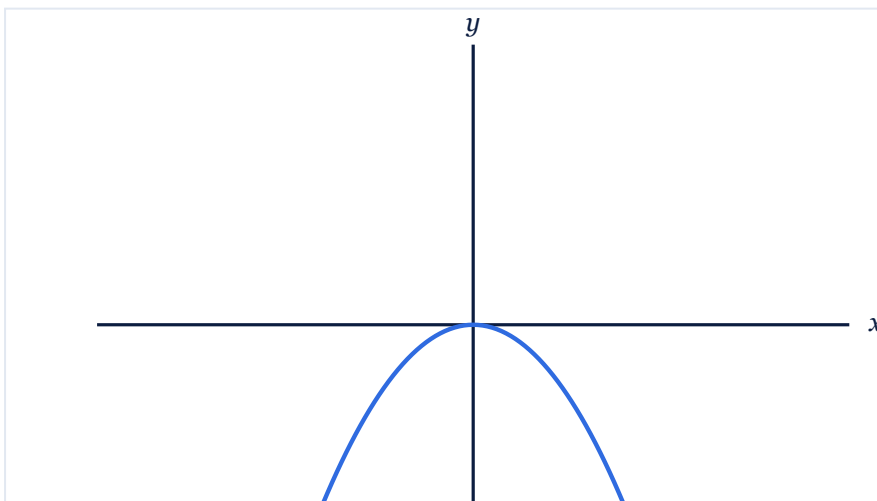
c. $y = \frac{5}{x}$



A

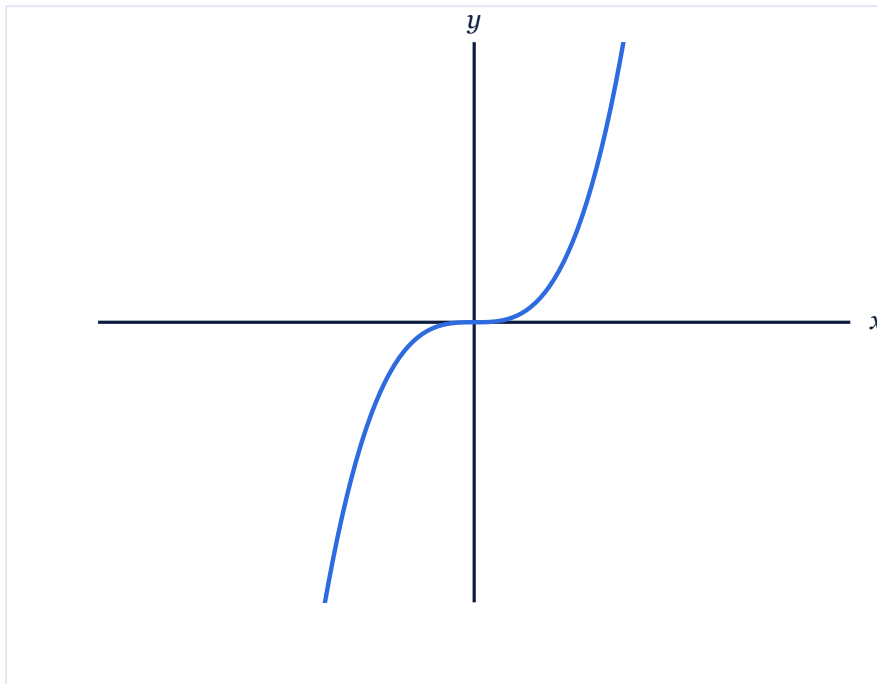


B

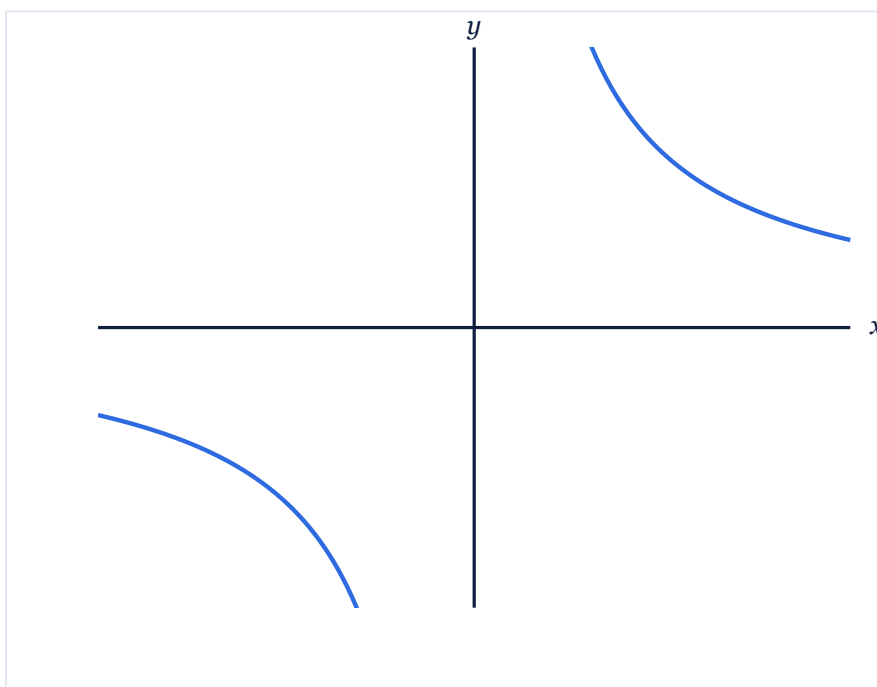




C



D



E

(3 marks)

a) $y = -x^2$ is an n-shaped (upside down) parabola: graph C

b) $y = x^3$ is an S-shaped cubic curve through the origin: graph D

c) $y = \frac{5}{x}$ is a reciprocal curve with two branches: graph E

9

The curve with equation $y = \frac{k}{x}$ passes through the point (4, 3).

- Work out the value of k .
- Work out the value of y when $x = -6$.
- Does the point $(-3, 4)$ lie on the curve? You must show how you get your answer.

(4 marks)

a)

$$3 = k/4$$

$$k = 3 \times 4$$

$$k = 12$$

b)

$$y = 12/x$$

$$y = 12 \div -6$$

$$y = -2$$

c)

$$x = -3: y = 12 \div -3 = -4$$

-4 is not 4

$$\text{No}$$

10

A curve has equation $y = \frac{8}{x}$

- Explain why there is no point on the curve where $x = 0$
- Work out the value of y when $x = -4$
- Does the point (2, 4) lie on the curve? You must show how you get your answer.

(3 marks)

a) $y = \frac{8}{x}$ requires dividing by x , and division by 0 is not possible, so the curve never meets the line $x = 0$

$$\text{b) When } x = -4: y = \frac{8}{-4} = -2$$

$$\text{c) When } x = 2: y = \frac{8}{2} = 4, \text{ so } (2, 4) \text{ does lie on the curve}$$

11

a. Complete the table of values for $y = x^3 - 3x$

x	-2	-1	0	1	2
y	-2			-2	

b. Explain how the table shows that the graph of $y = x^3 - 3x$ passes through the origin.

(3 marks)

a) When $x = -1$: $y = -1 + 3 = 2$; when $x = 0$: $y = 0$; when $x = 2$: $y = 8 - 6 = 2$

b) The table gives $y = 0$ when $x = 0$, so the point $(0, 0)$ is on the curve

12

A curve has equation $y = \frac{10}{x}$ a. Work out the value of y when $x = 0.5$ b. Work out the value of y when $x = -5$ c. Explain what happens to y as x gets very large, and why this means the curve never touches the x -axis.

(4 marks)

a)

$$y = 10 \div 0.5$$

$$y = 20$$

b)

$$y = 10 \div -5$$

$$y = -2$$

c)

$$x = 1000: y = 0.01$$

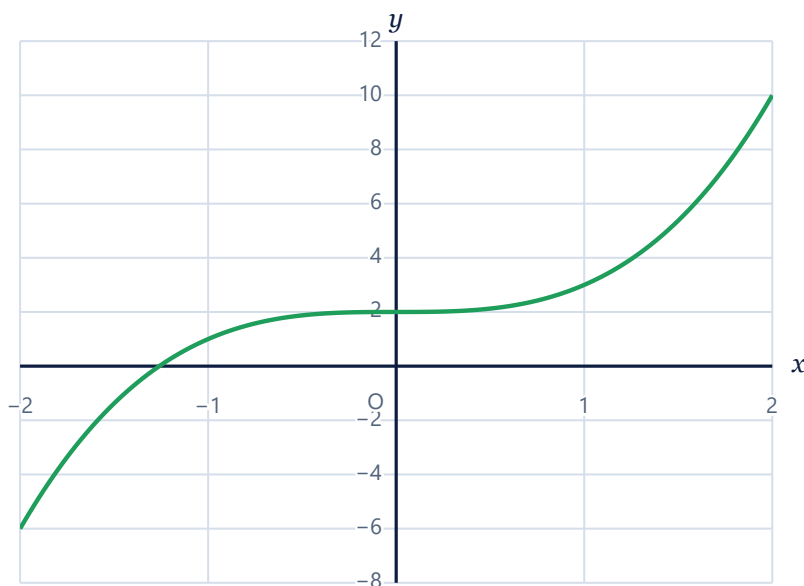
$$x = 1\,000\,000: y = 0.00001$$

y gets closer to 0 but never reaches it

13

a. Complete the table of values for $y = x^3 + 2$

x	-2	-1	0	1	2
y	-6		2		10

b. On the grid, draw the graph of $y = x^3 + 2$ for values of x from -2 to 2

(4 marks)

a) When $x = -1$: $y = -1 + 2 = 1$; when $x = 1$: $y = 1 + 2 = 3$

b) Plot the five points and join them with a smooth curve

14

a. Complete the table of values for $y = x^3 - 2x^2$

x	-1	0	1	2	3
y		0			9

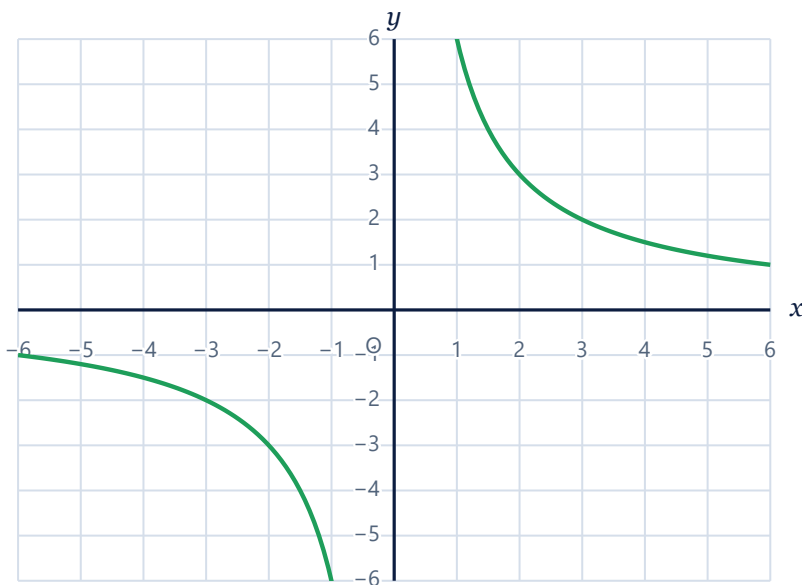
b. Use the table to write down two values of x for which $y = 0$

(4 marks)

a) When $x = -1$: $y = -1 - 2 = -3$; when $x = 1$: $y = 1 - 2 = -1$; when $x = 2$: $y = 8 - 8 = 0$ b) The table shows $y = 0$ at $x = 0$ and at $x = 2$

15

- a. On the axes, sketch the graph of $y = \frac{6}{x}$ for negative and positive values of x
- b. Write down the coordinates of any points where the graph crosses the coordinate axes.



(4 marks)

a) For positive x , y is positive (branch in the first quadrant); for negative x , y is negative (branch in the third quadrant)

a) As x gets large the curve gets closer to the x -axis; as x gets close to 0 the curve gets closer to the y -axis

b) $y = \frac{6}{x}$ can never equal 0, and x can never equal 0, so the graph never crosses either axis