Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Cubic and Reciprocal Graphs

Calculator Not Allowed

INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.

- Write your answers in the spaces provided in this question paper.

- Answer ALL questions.

- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

- You should have a ruler, compass and protractor where required.

Total Marks :

1) Match each of the graphs shown below with an equation from the following list.　　　[3]

$y = x^2 + 1$　　　　　　$y = x^2 - 1$　　　　　　$y = x^3 + 1$　　　　　　$y = x^3 - 1$

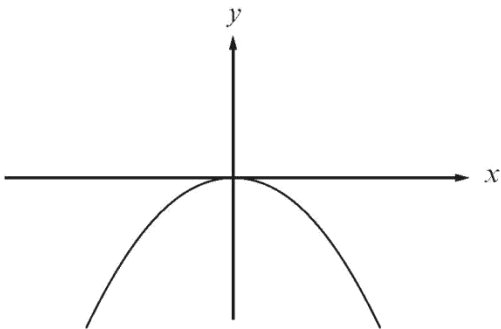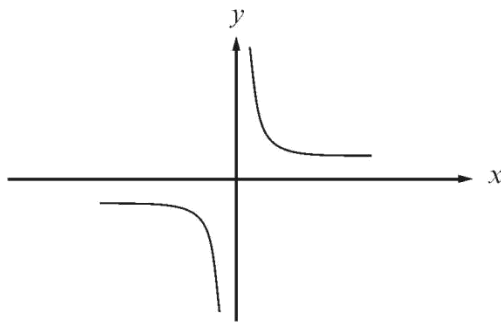$y = -x^3$　　　　　　　$y = -x^2$　　　　　　　$y = -x^2 + 1$　　　　　$y = -x^3 + 1$
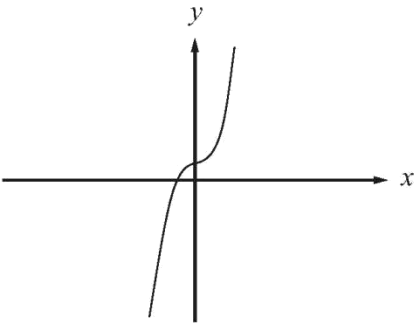
$y = \dfrac{1}{x}$　　　　　　　$y = \dfrac{-1}{x}$　　　　　　$y = x$　　　　　　　$y = -x$

	$y = $ ....
	$y = $ ....
	$y = $ ....

2) The table below shows some values of $y = x^3 - 3x + 4$ for values of x from -3 to 3.

x	-3	-2	-1	0	1	2	3
$y = x^3 - 3x + 4$	-14		6	4	2	6	

(a) Complete the table above. [2]

....

....

(b) On the graph paper below draw the graph of $y = x^3 - 3x + 4$ for the values of x from -3 to 3. [2]
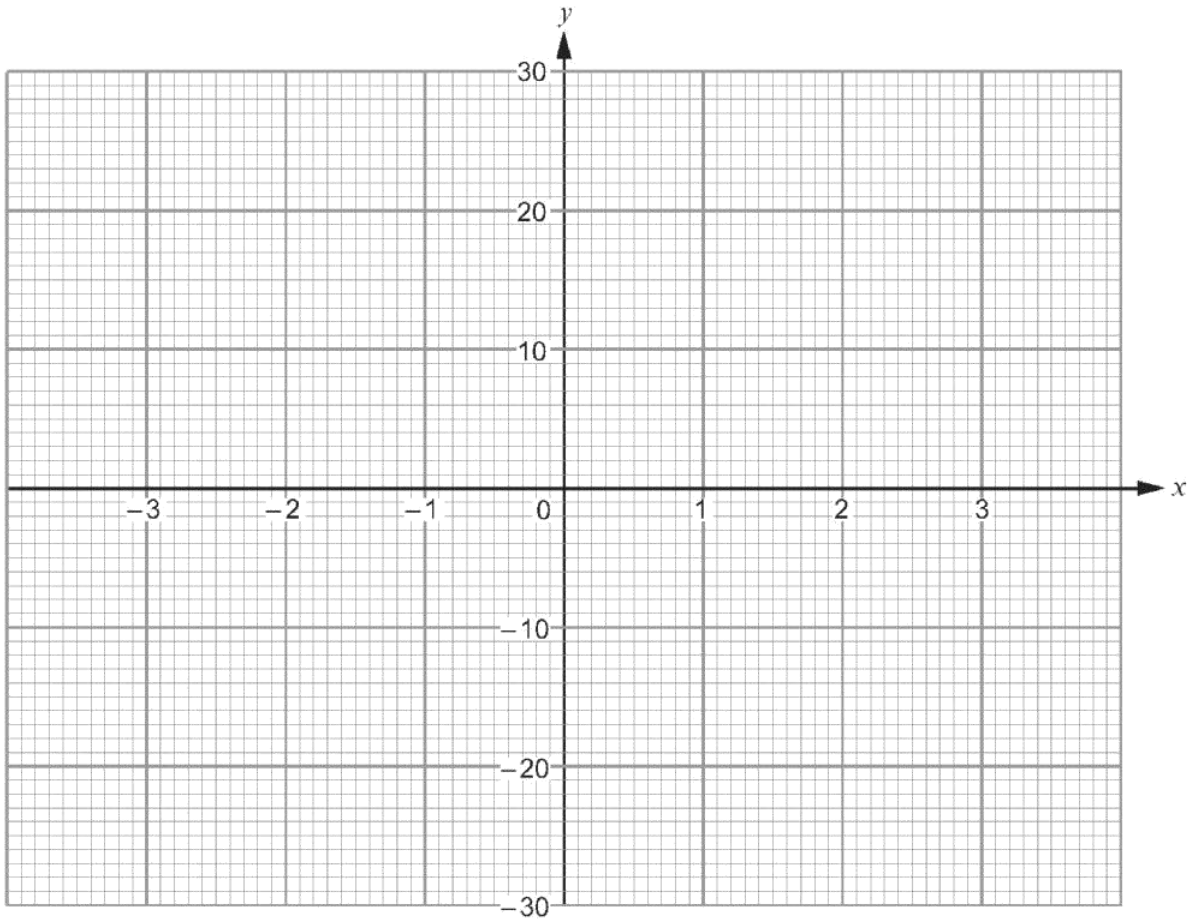
(c) Use your graph to write down the coordinates of the two points where the gradient is zero. [2]
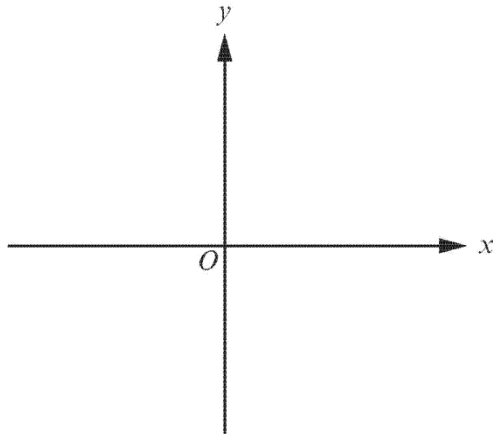
(.............. , ...)   (.............. , ...)

(d) Use your graph to write down the solution of the equation $x^3 - 3x + 4 = 0$. [1]

....
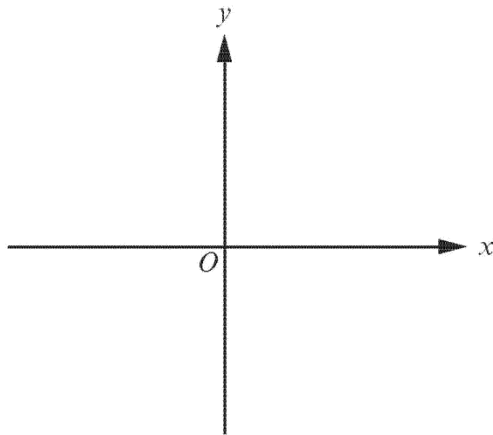
3) *(a)* Use the axes provided to sketch the graphs of the following.
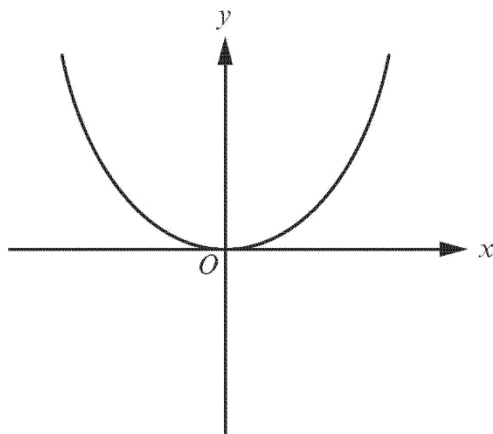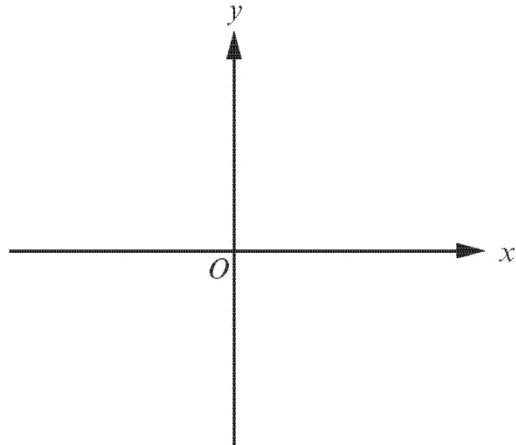
(i) $y = x^3$

[1]

(ii) $y = \dfrac{1}{x}$

[1]

(b) The sketch below shows $y = x^2$

Use this graph to help you draw the graphs on the next page.

Use the axes provided to sketch the graphs of the following.
Give coordinates of any points where the graphs intersect the y-axis.

(i) $y = -x^2$

[1]

(ii) $y = x^2 + 3$
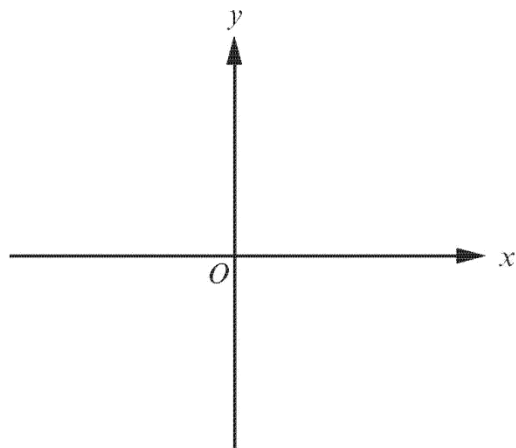
[2]

(iii) $y = 8x^2$

[1]

4)
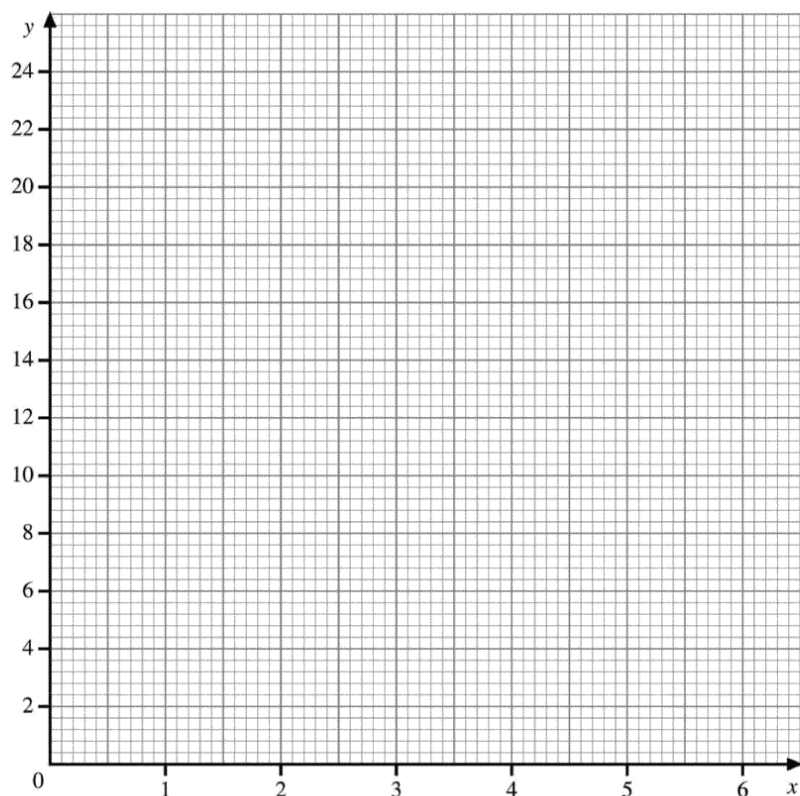
(a) Draw the graph of $y = \dfrac{24}{x}$ on the graph paper above, for values of x from 1 to 6. [2]

(b) Use the graph to find the value of $\dfrac{24}{2.3}$ as accurately as possible.

Answer _____ [1]

(c) Explain what happens to the value of y when the value of x gets closer to 0.

Answer _____ [1]

5) Match each of the given graphs with one of the possible equations shown below.
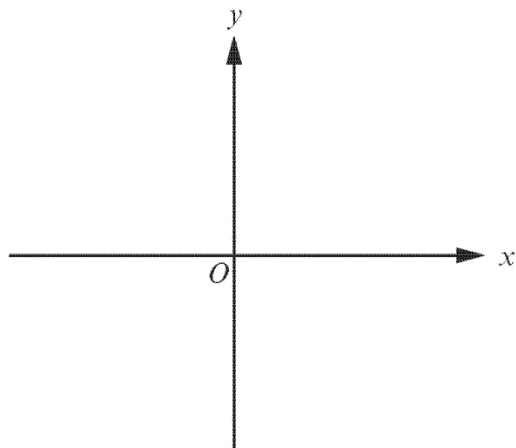
Possible equations:

$$y = x \qquad y = x^2 \qquad y = x^3 \qquad y = \frac{1}{x} \qquad y = -x \qquad y = -x^2$$

Graphs
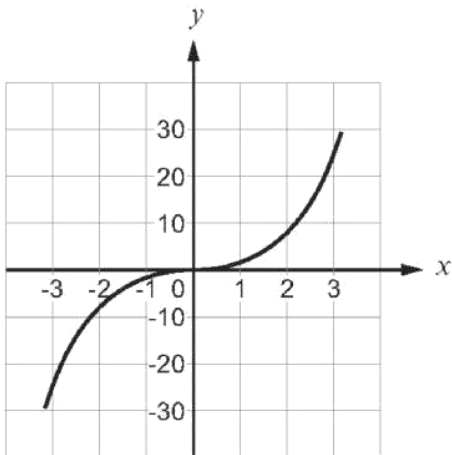
Equation: .... [1]
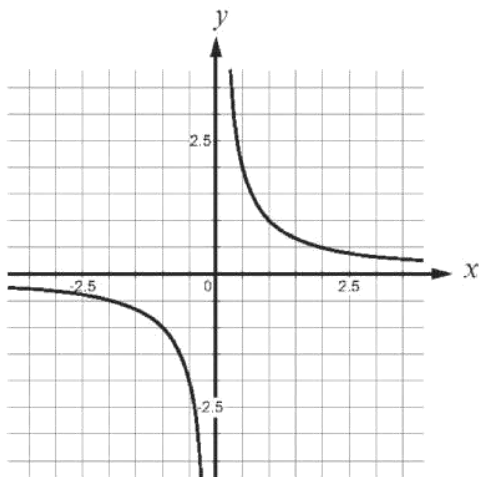
Equation: .... [1]
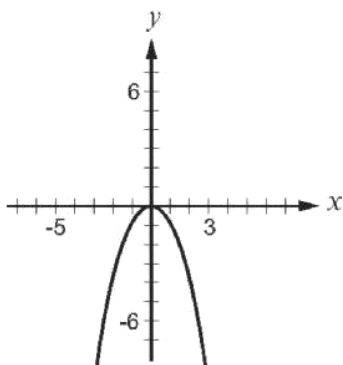
Equation: .... [1]

6) The graph of $y = x^3 - 6x$ is shown.
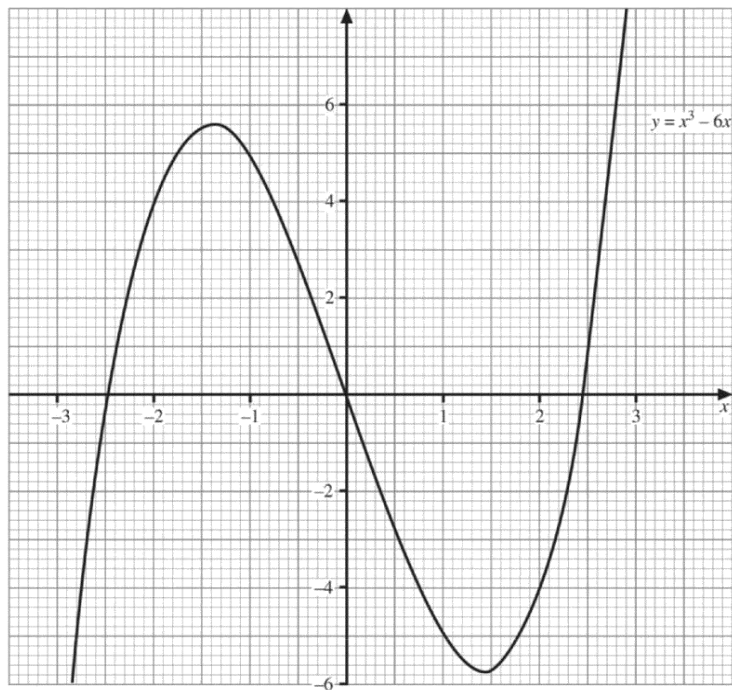
(a) Use the graph to find solutions to the equation $x^3 - 6x = 0$
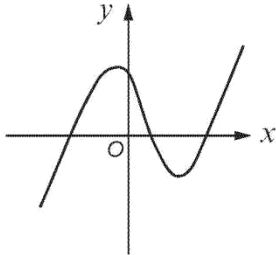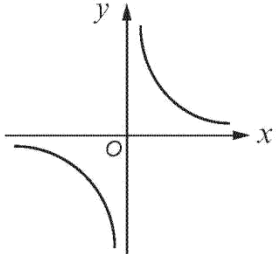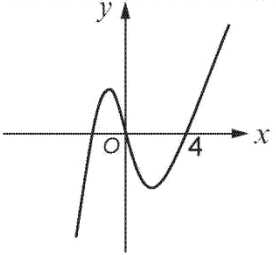
Answer $x =$ _____ [1]

(b) By drawing an appropriate straight line, find solutions to the equation
$x^3 - 8x - 1 = 0$

Answer $x =$ _____ [3]

7) Circle either TRUE or FALSE for each statement given below. [2]

GRAPH	STATEMENT		
	The equation of this graph could be $y = -x^3 - 2$.	TRUE	FALSE
	The equation of this graph could be $y = x^3 - 9x$.	TRUE	FALSE
	The equation of this graph could be $y = x^{-1}$.	TRUE	FALSE
	The equation of this graph could be $y = x^3 + 4$.	TRUE	FALSE

....

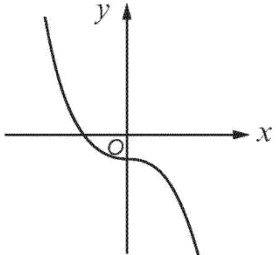...

....

....

....

....

8) The table shows values of $y = x^3 + 1$ for values of x from -3 to 3.

x	-3	-2	-1	0	1	2	3
$y = x^3 + 1$	-26	-7		1	2		28

   (a)   Complete the table above. [2]

....

....

(b) On the graph paper below, draw the graph of $y = x^3 + 1$ for the values of x from -3 to 3.

[2]
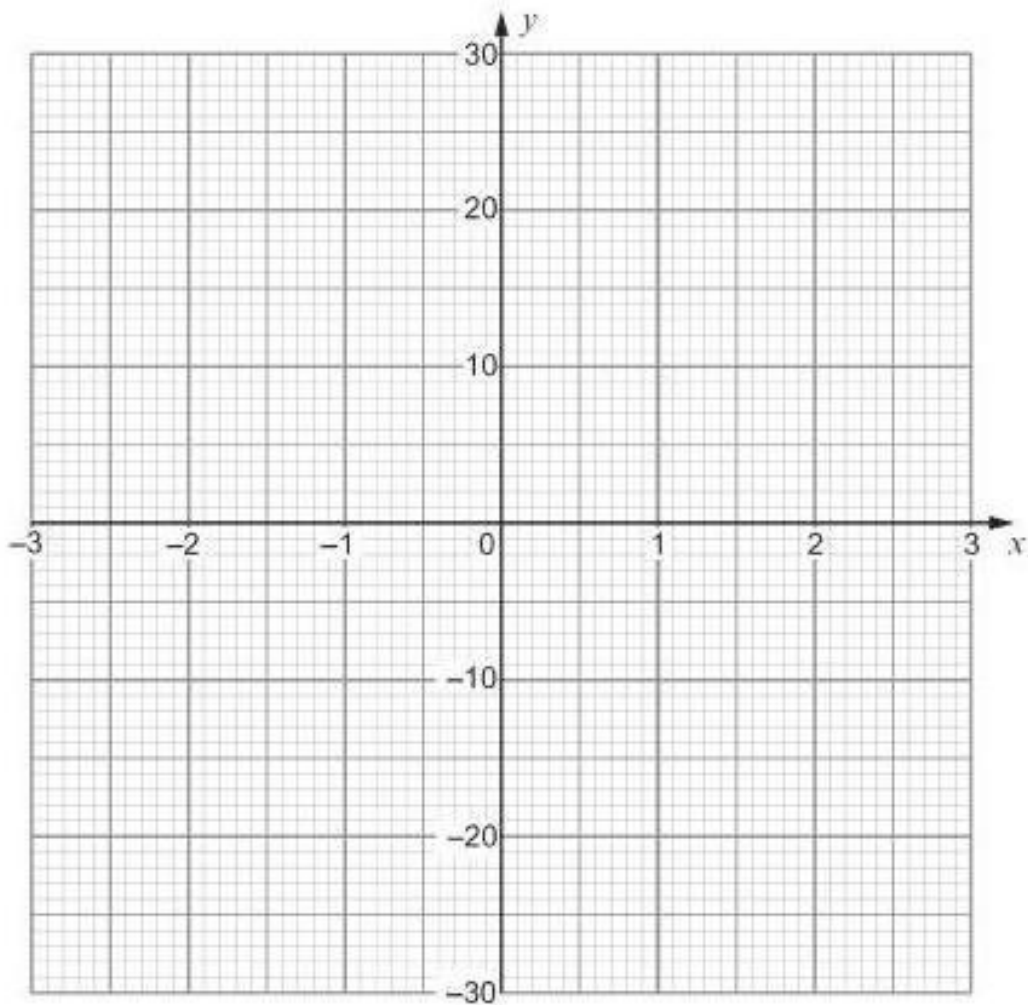
(c) Draw the line $y = -10$ on your graph paper and write down the x-coordinate of the point where this line intersects the curve $y = x^3 + 1$

.... [2]

9)
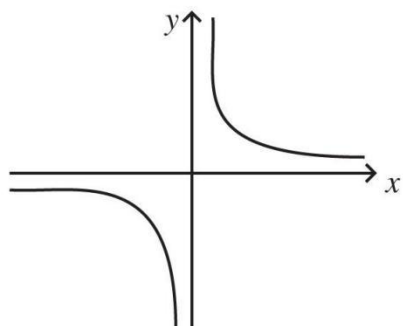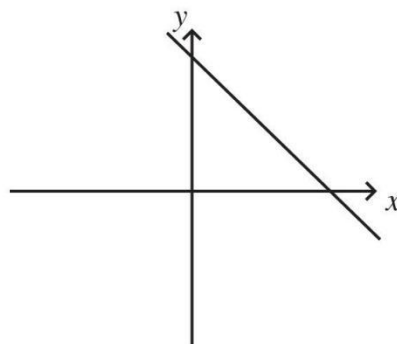
Equation _____   Equation _____

Match each of these graphs with the correct equation from the list given

A: $y + x = 6$

B: $y = -\dfrac{6}{x}$

C: $y = \dfrac{6}{x}$ [2]

10) Use the axes below to sketch the graph of $y = 2^x$.
    You must give the coordinates of any point at which your sketch intersects an axis.   [2]

11) The graph of $y = 2x^3 - 6x^2 + x + 15$ is shown below, for values of x from −2 to 3.

(a)   Use the graph to solve the equation $2x^3 - 6x^2 + x + 15 = 10$.   [2]

....

....

(b)   Estimate the gradient of the curve at $x = -1$.   [3]

....

....

....

....

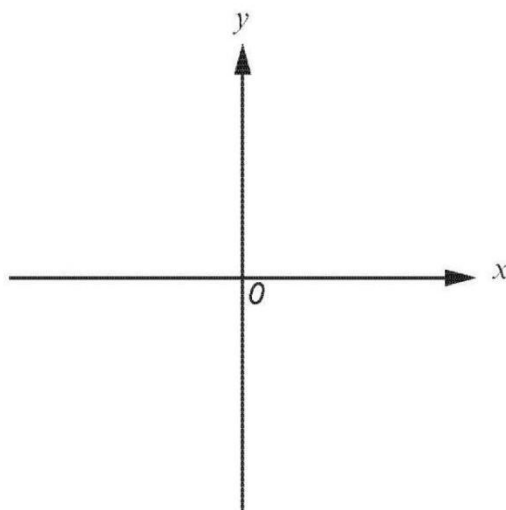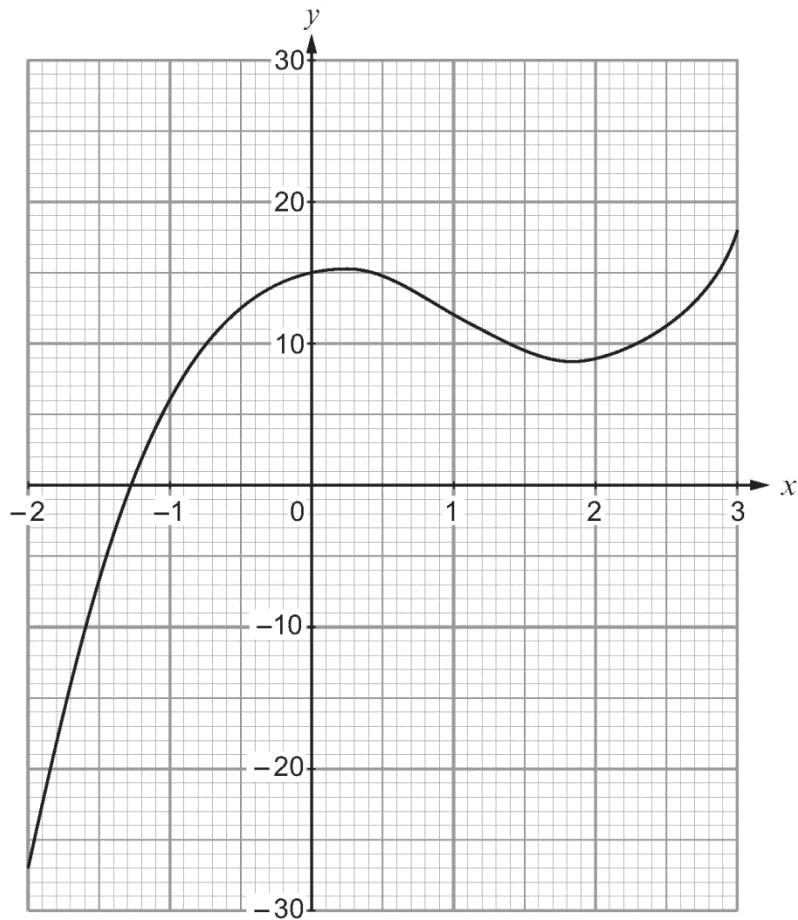**12)** The table shows some of the values of $y = x^3 + 6$ for values of x from –2 to 3.

   (a)   Complete the table by finding the value of y for $x = -1$ and $x = 2$.   [2]
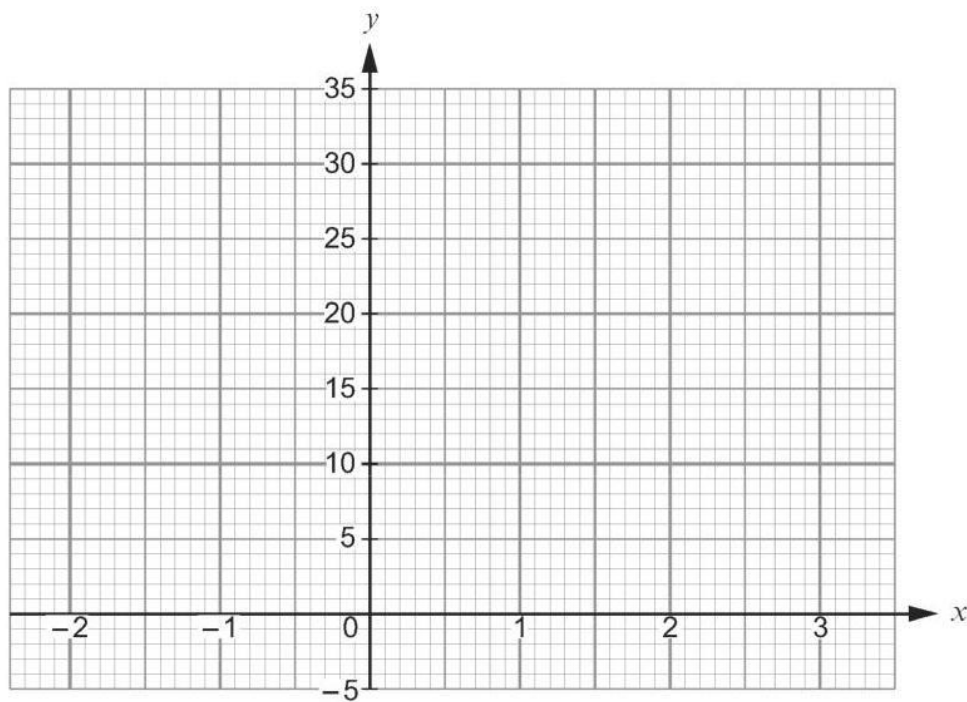
x	–2	–1	0	1	2	3
$y = x^3 + 6$	–2		6	7		33

....

....

....

   (b)   On the graph paper below, draw the graph of $y = x^3 + 6$ for values of x from –2 to 3.   [2]

   (c)   Faye wants to solve the equation $x^3 + 6 = 10$ by first drawing a line on the graph above.
   Show how Faye would do this on the graph above.
   You do not need to find the solution of the equation.   [1]