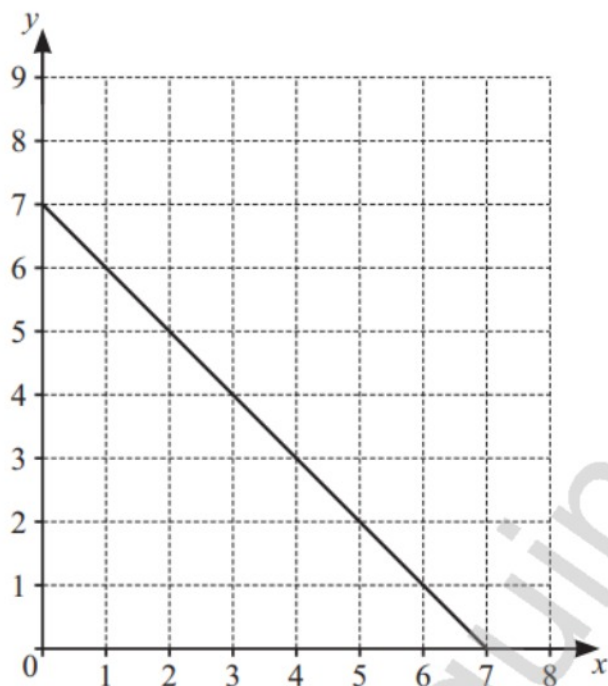




The line $x + y = 7$ is drawn on the grid.

(a) On the grid, draw the line $y = 2x + 1$.

[2]

(b) Use your graph to solve these simultaneous equations.

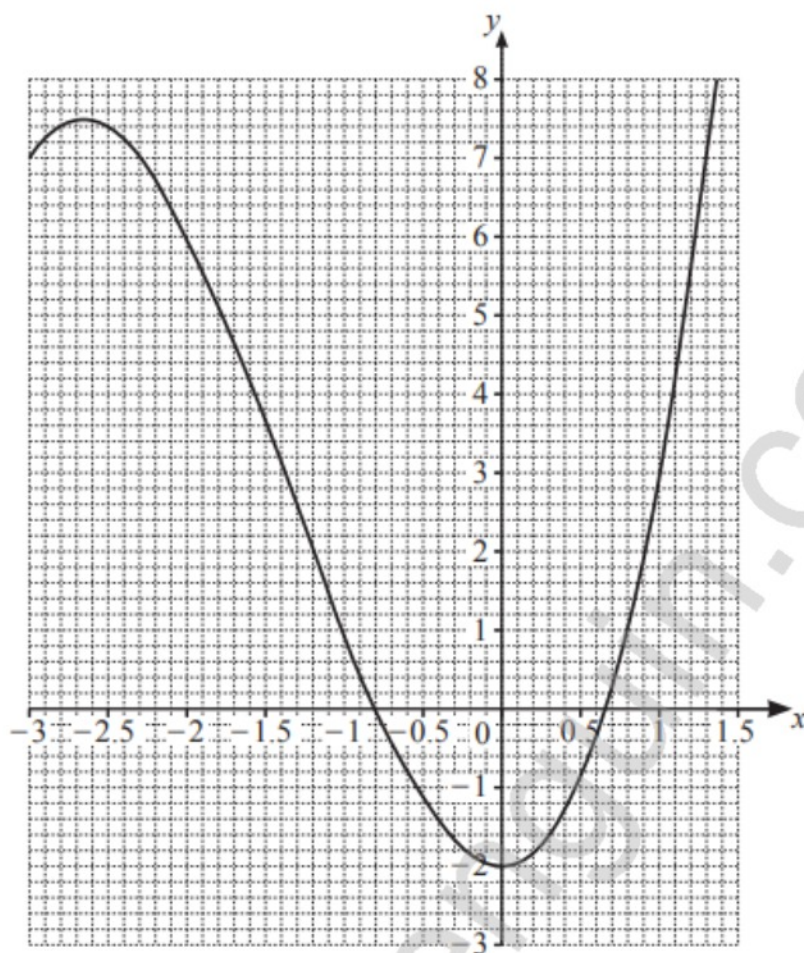
$$x + y = 7$$

$$y = 2x + 1$$

$x =$

$y =$

[1]



The diagram shows the graph of $y = x^3 + 4x^2 - 2$ for $-3 \leq x \leq 1.5$.

By drawing a suitable straight line, solve the equation $x^3 + 4x^2 - 2 = 2x$ for $-3 \leq x \leq 1.5$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

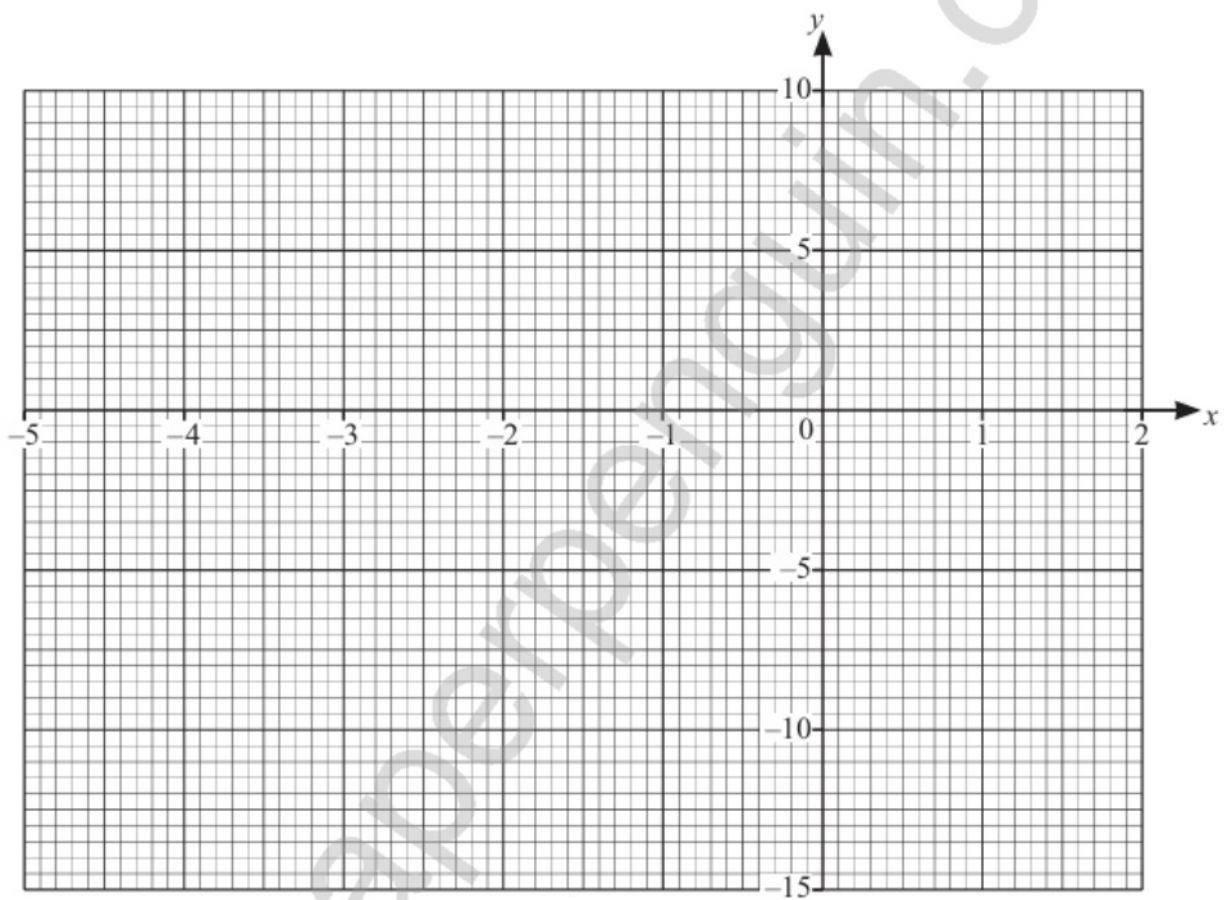
- 2 The table shows some values for $y = x^3 + 4x^2 - 4$.

x	-4.5	-4	-3	-2	-1	0	1	1.5
y	-14.1		5	4		-4	1	8.4

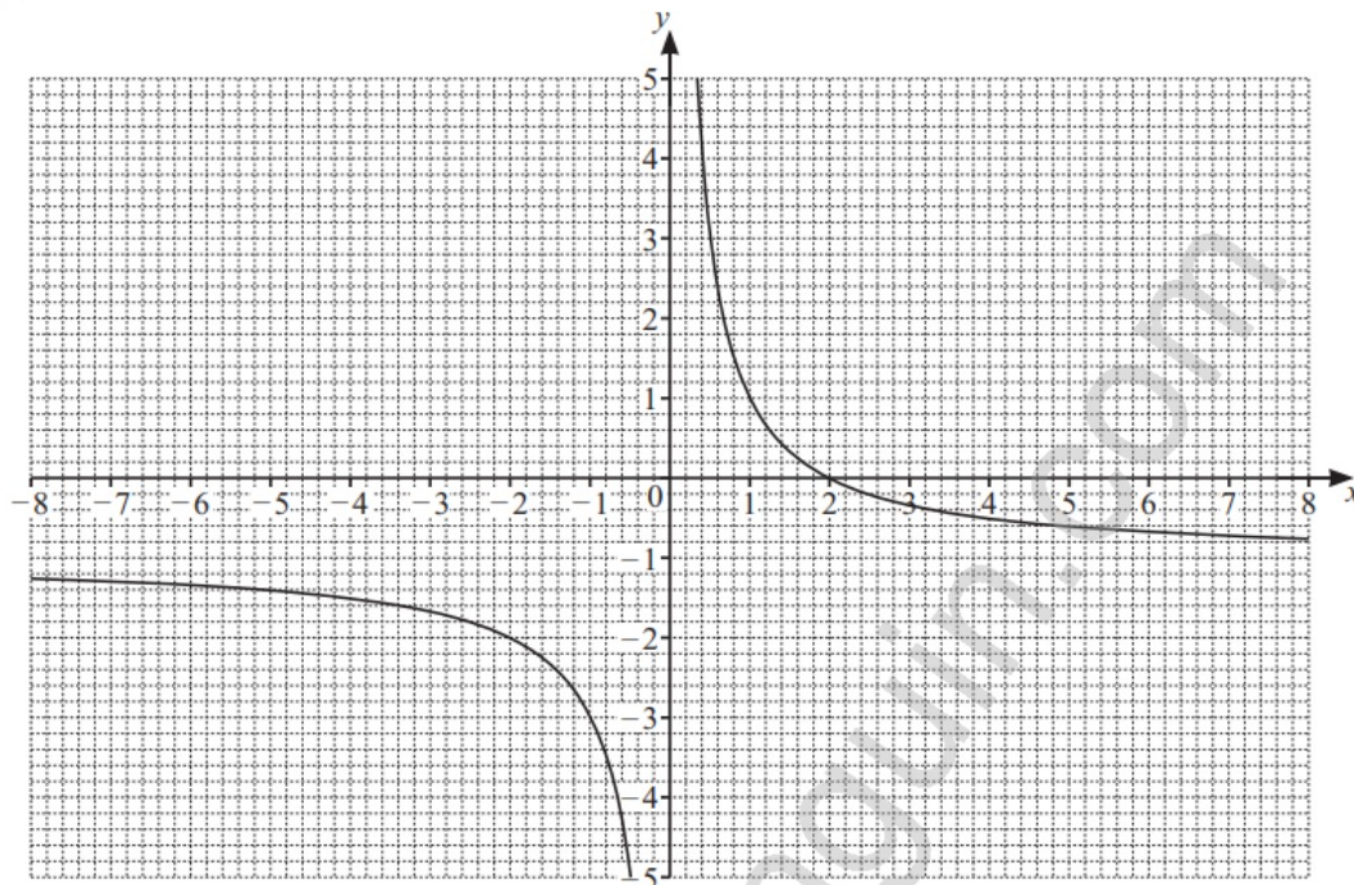
(a) Complete the table.

[2]

(b) On the grid, draw the graph of $y = x^3 + 4x^2 - 4$ for $-4.5 \leq x \leq 1.5$.



[4]



The diagram shows the graph of $y = \frac{2}{x} - 1$.

(a) Write down the coordinates of the point where the graph crosses the x -axis.

(..... ,) [1]

(b) Write down the equation of each asymptote.

.....

.....

[2]

(c) By drawing a suitable straight line on the grid, solve $\frac{2}{x} - x - 1 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

2 (a) (i) $y = 2^x$

Complete the table.

x	0	1	2	3	4
y		2	4	8	

[2]

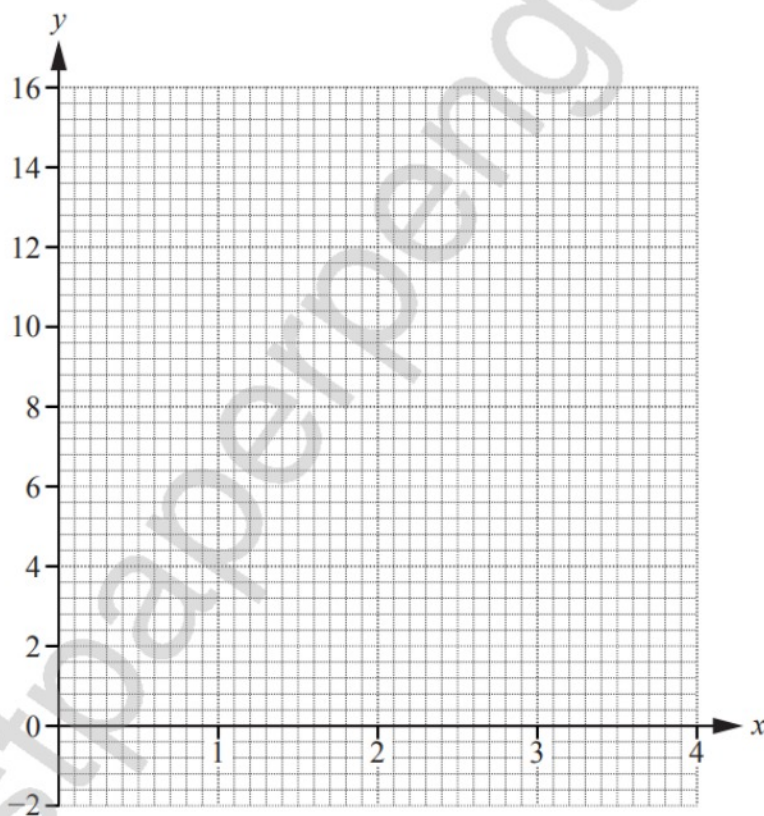
(ii) $y = 14 - x^2$

Complete the table.

x	0	1	2	3	4
y		13	10	5	

[2]

(b) On the grid, draw the graphs of $y = 2^x$ and $y = 14 - x^2$ for $0 \leq x \leq 4$.



[6]

(c) Use your graphs to solve the equations.

(i) $2^x = 12$

$x = \dots\dots\dots$ [1]

(ii) $2^x = 14 - x^2$

$x = \dots\dots\dots$ [1]

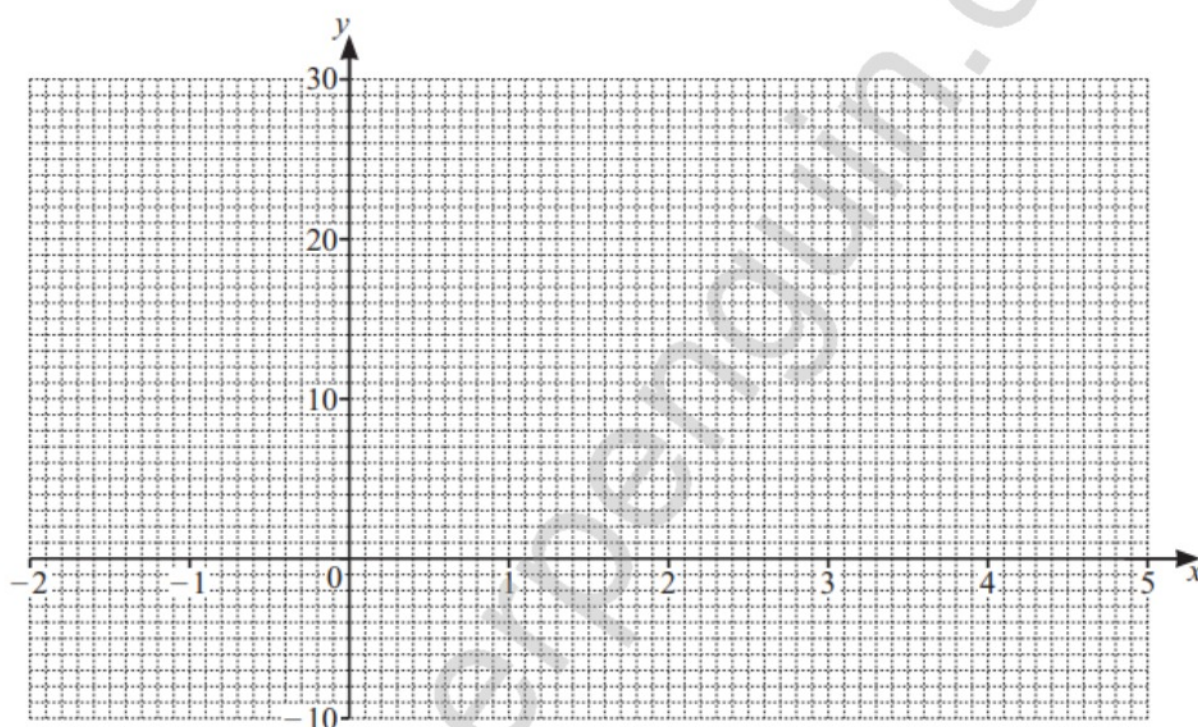
- 14 The table shows some values for $y = 5x^2 - x^3 - 4$.

x	-2	-1	0	1	2	3	4	5
y	24		-4		8	14		-4

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = 5x^2 - x^3 - 4$ for $-2 \leq x \leq 5$.



[4]

(c) By drawing a suitable straight line on the grid, solve the equation $x^3 - 5x^2 - x + 14 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

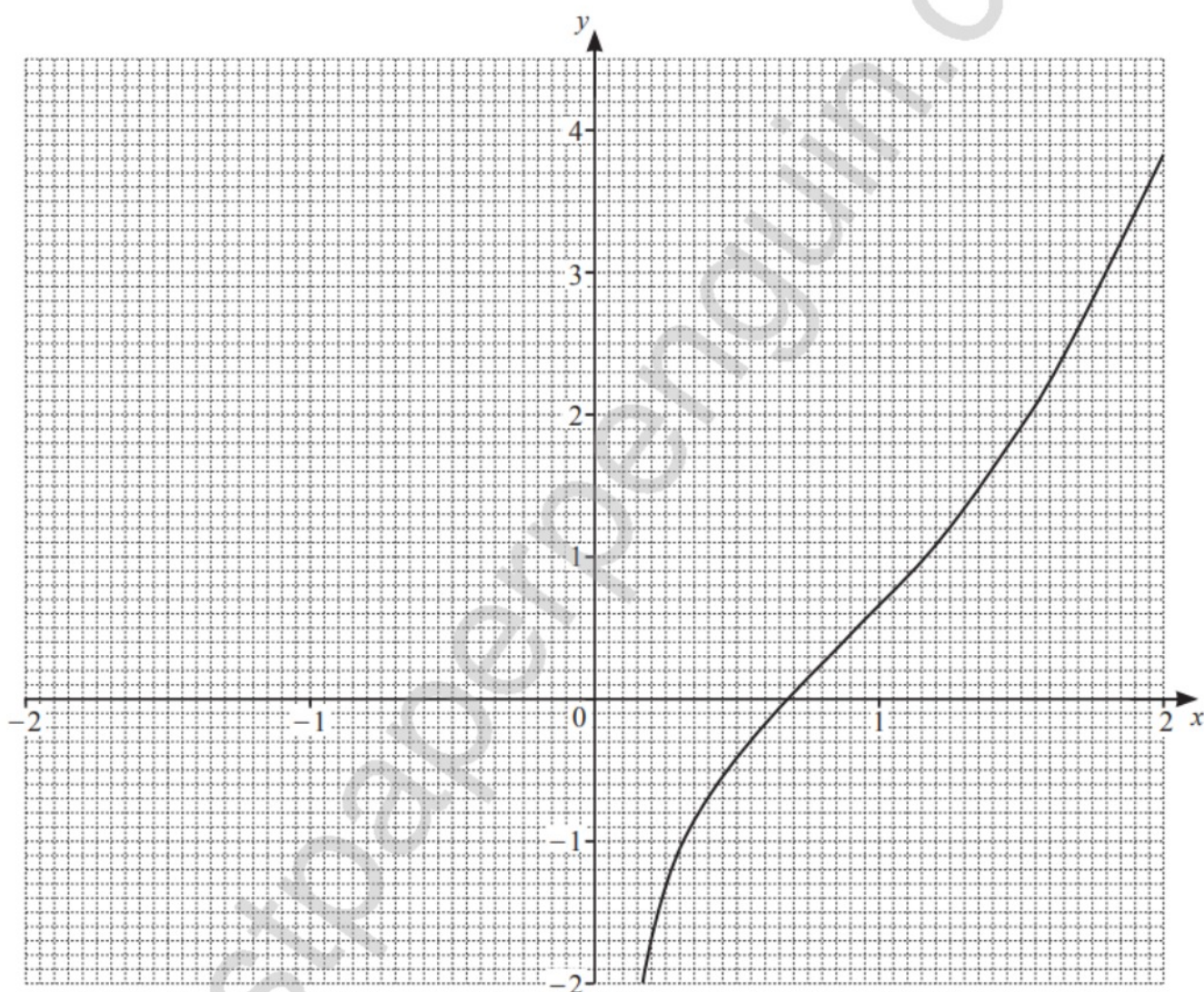
- 2 The table shows some values for $y = x^2 - \frac{1}{3x}$, $x \neq 0$.
The y -values are rounded to 1 decimal place.

x	-2	-1.5	-1	-0.75	-0.5	-0.25	-0.1
y	4.2	2.5	1.3			1.4	3.3

(a) Complete the table. [2]

(b) On the grid, draw the graph of $y = x^2 - \frac{1}{3x}$ for $-2 \leq x \leq -0.1$.

The graph of $y = x^2 - \frac{1}{3x}$ for $x > 0$ has been drawn for you.



[4]

(c) By drawing a suitable line on the grid, solve the equation $x^2 - \frac{1}{3x} + 1 = 0$.

$x =$ [2]

- 5 The table shows some values of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leq x \leq 3.5$.

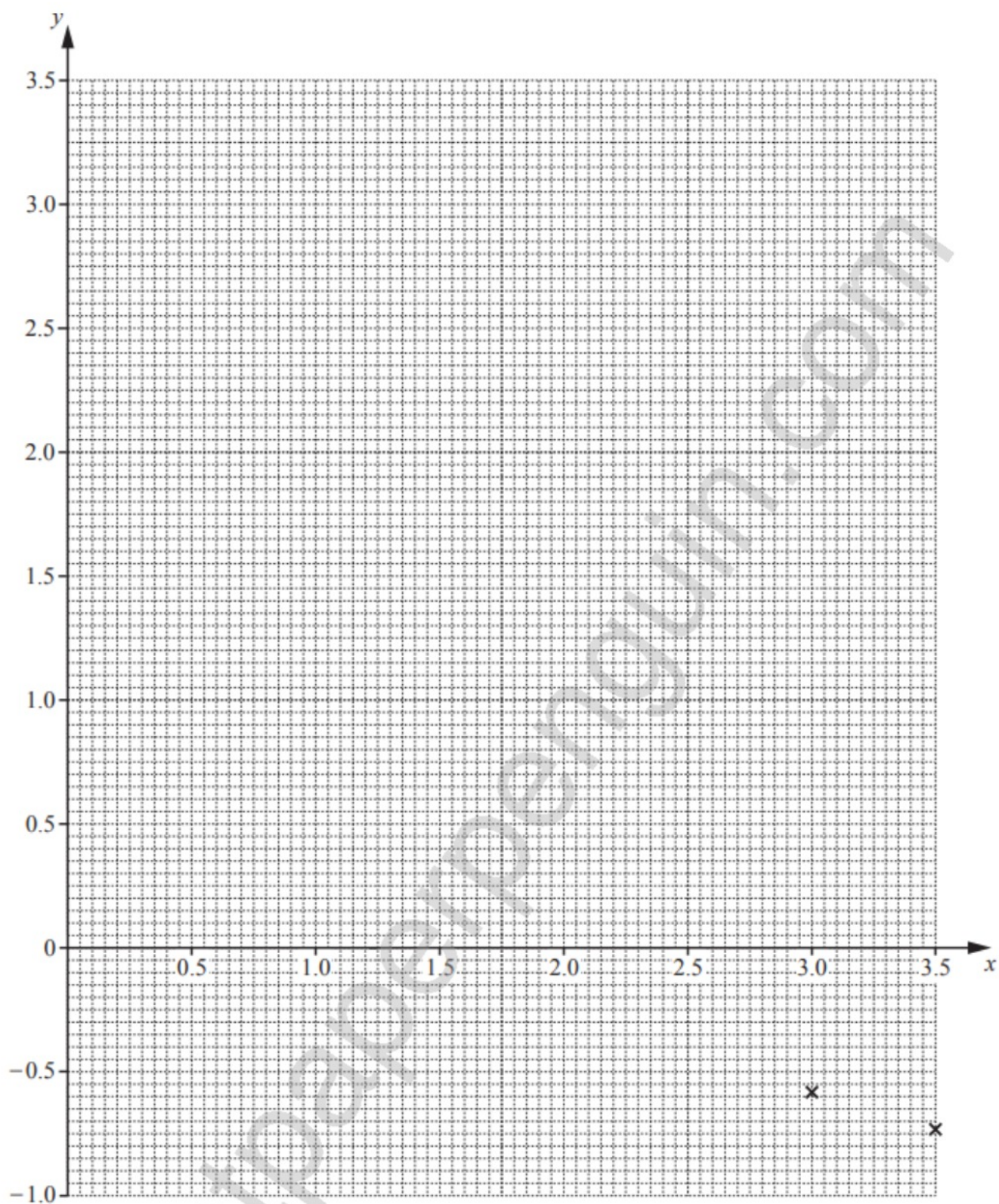
x	0.15	0.2	0.5	1	1.5	2	2.5	3	3.5
y	3.30		0.88		-0.04		-0.43	-0.58	-0.73

(a) Complete the table.

(b) On the grid, draw the graph of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leq x \leq 3.5$.

The last two points have been plotted for you.

[3]



[4]

- (c) Use your graph to solve the equation $\frac{1}{2x} - \frac{x}{4} = \frac{1}{2}$ for $0.15 \leq x \leq 3.5$.

$x = \dots\dots\dots$ [1]

- (d) (i) On the grid, draw the line $y = 2 - x$. [2]

- (ii) Write down the x co-ordinates of the points where the line $y = 2 - x$ crosses the graph of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leq x \leq 3.5$.

$x = \dots\dots\dots$ and $x = \dots\dots\dots$ [2]

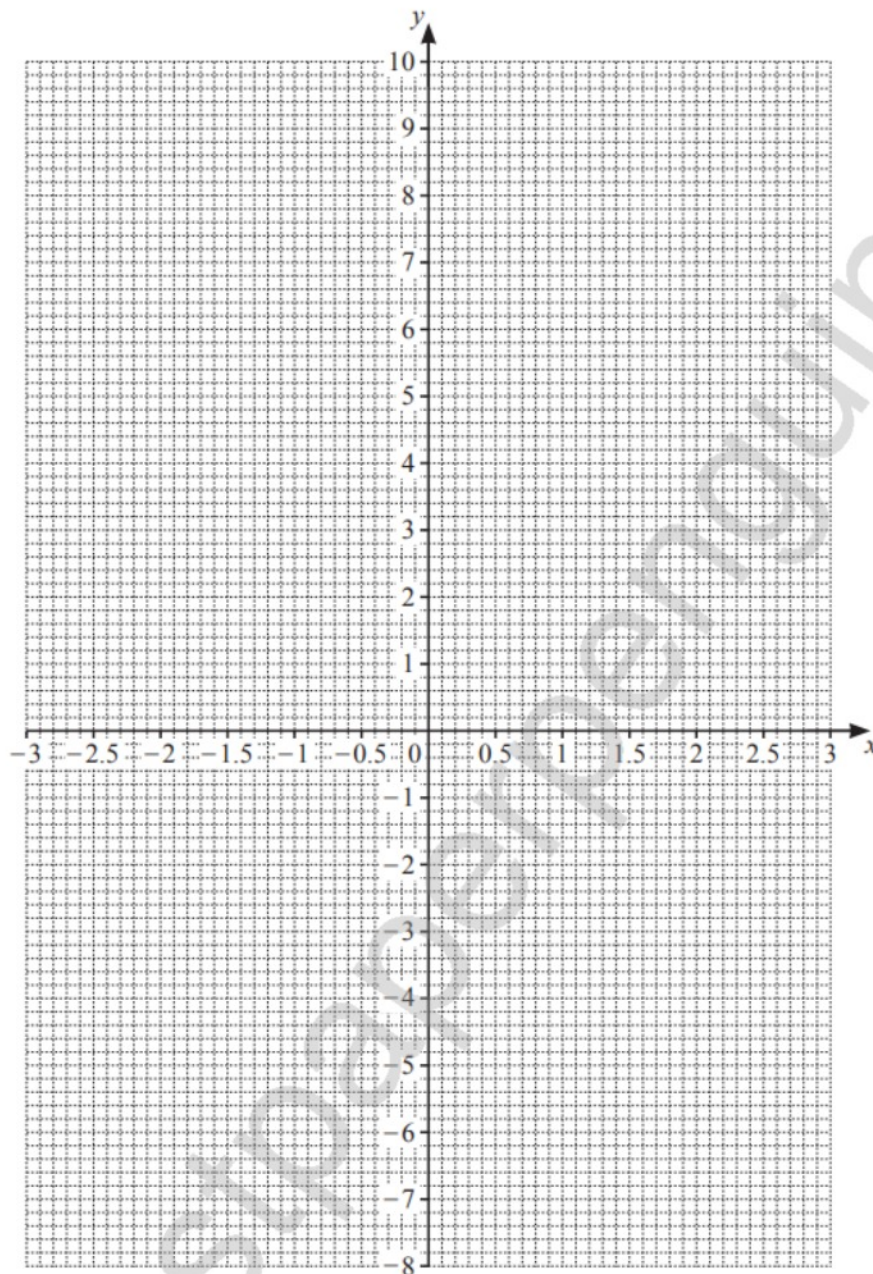
- 6 The table shows some values for $y = x^2 - \frac{3}{2x}$, $x \neq 0$, given correct to 1 decimal place.

x	-3	-2	-1	-0.5	-0.2	0.2	0.5	1	2	3
y			2.5	3.3	7.5	-7.5	-2.8	-0.5	3.3	

- (a) (i) Complete the table.

[3]

- (ii) On the grid, draw the graph of $y = x^2 - \frac{3}{2x}$ for $-3 \leq x \leq -0.2$ and $0.2 \leq x \leq 3$.



[5]

- (b) By drawing a suitable straight line on the grid, solve the equation $x^2 - \frac{3}{2x} = \frac{24}{5} - 2x$ for $-3 \leq x \leq -0.2$ and $0.2 \leq x \leq 3$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

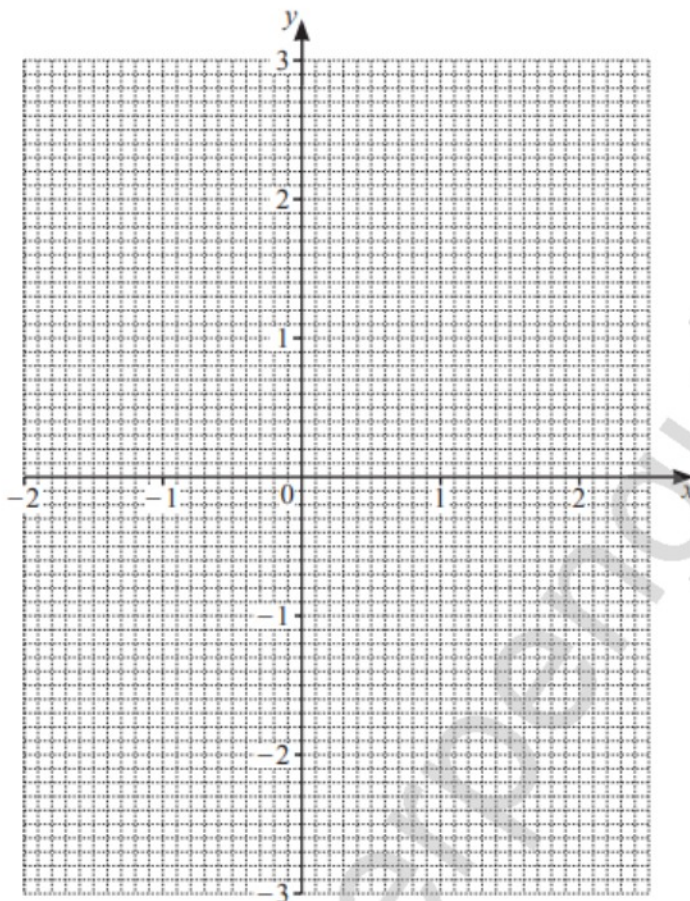
10 The table shows some values for $y = 2^x - 3$.

x	-2	-1	0	0.5	1	1.5	2	2.5
y	-2.75			-1.58		-0.17	1	2.66

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = 2^x - 3$ for $-2 \leq x \leq 2.5$.



[4]

(c) Use your graph to solve the equation $2^x - 3 = 2$.

$x = \dots\dots\dots$ [1]

(d) By drawing a suitable straight line, solve the equation $2^x - x - 1.5 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

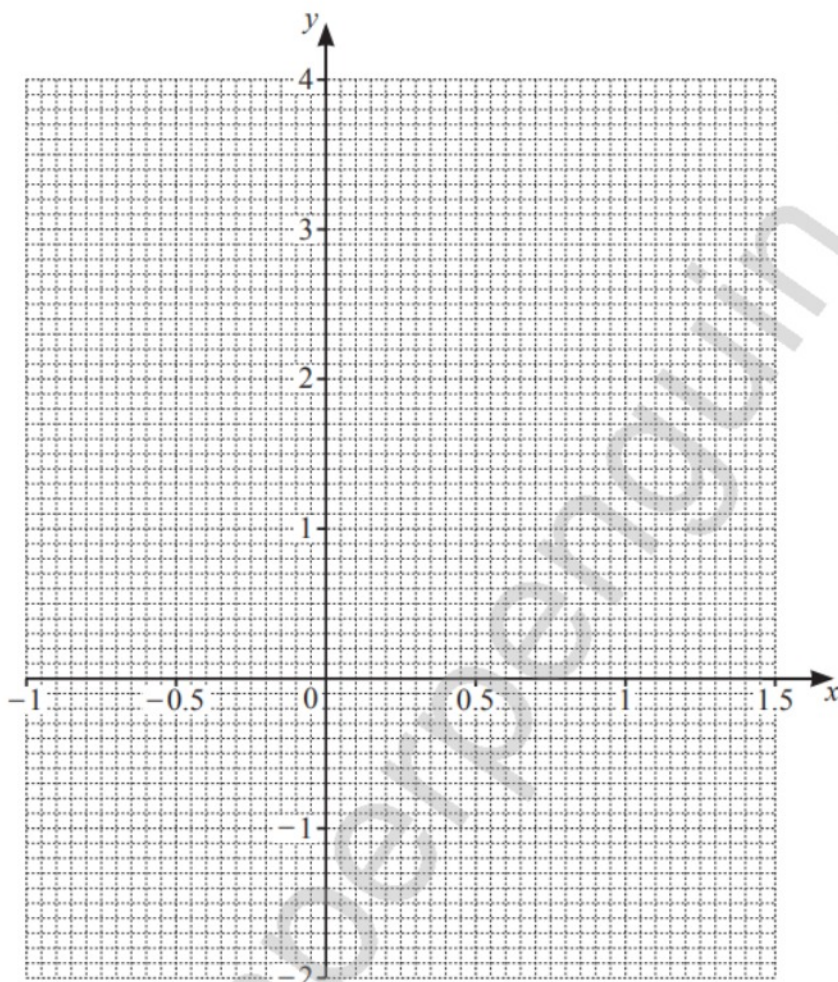
20 The table shows some values for $y = 3x^2 - 2x - 1$.

x	-1	-0.5	0	0.5	1	1.5
y	4		-1		0	2.75

(a) Complete the table.

[1]

(b) On the grid, draw the graph of $y = 3x^2 - 2x - 1$ for $-1 \leq x \leq 1.5$.



[3]

(c) By drawing a suitable straight line, solve the equation $3x^2 - 4x - 2 = 0$ for $-1 \leq x \leq 1.5$.

$x =$ [3]

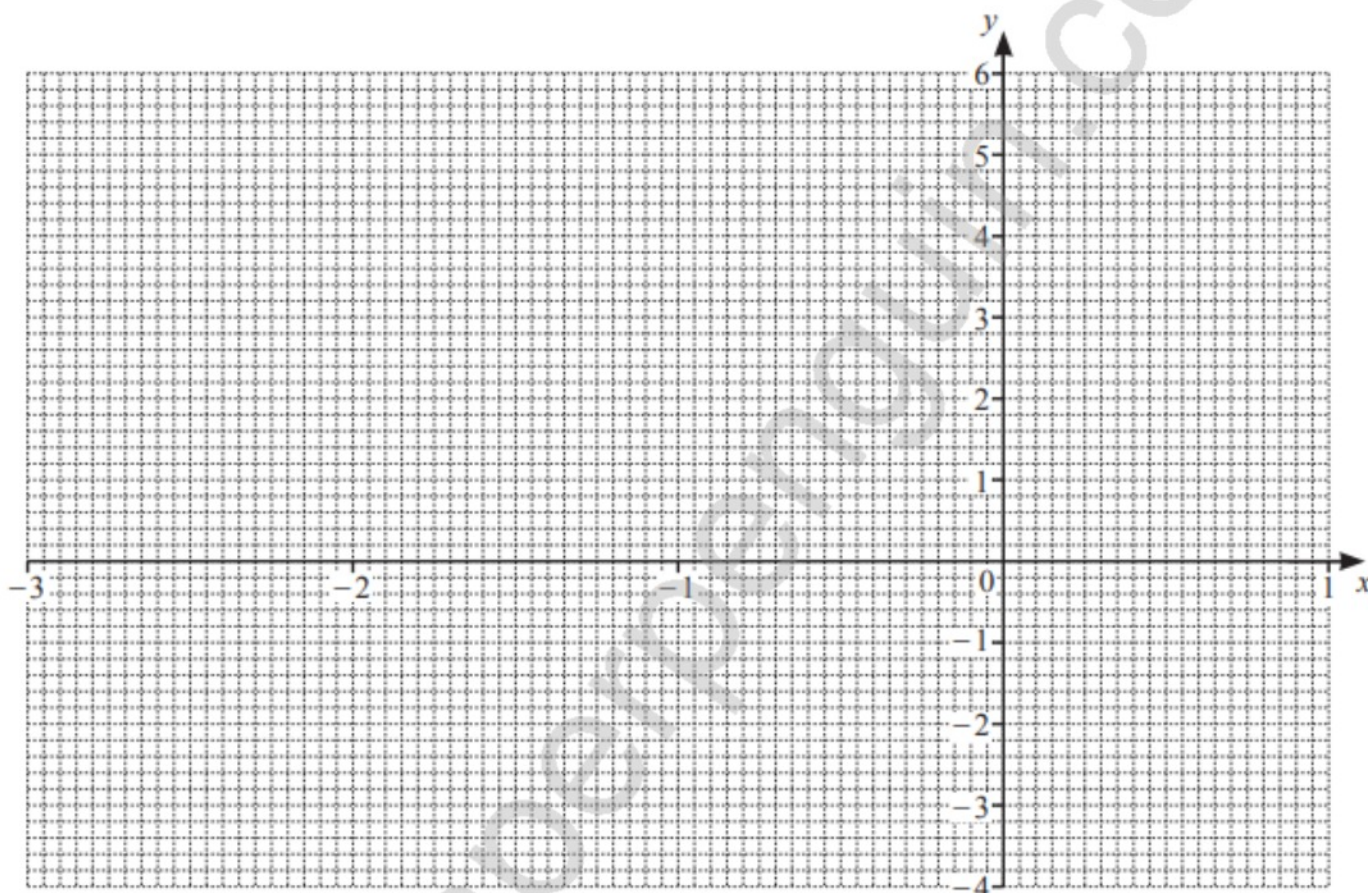
10 The table shows some values for $y = 2x^3 + 6x^2 - 2.5$.

x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1
y		3.75	5.5	4.25	1.5		-2.5	-0.75	

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = 2x^3 + 6x^2 - 2.5$ for $-3 \leq x \leq 1$.



[4]

(c) By drawing a suitable line on the graph, solve the equation $2x^3 + 6x^2 = 4.5$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(d) The equation $2x^3 + 6x^2 - 2.5 = k$ has exactly two solutions.

Write down the two possible values of k .

$k = \dots\dots\dots$ or $k = \dots\dots\dots$ [2]

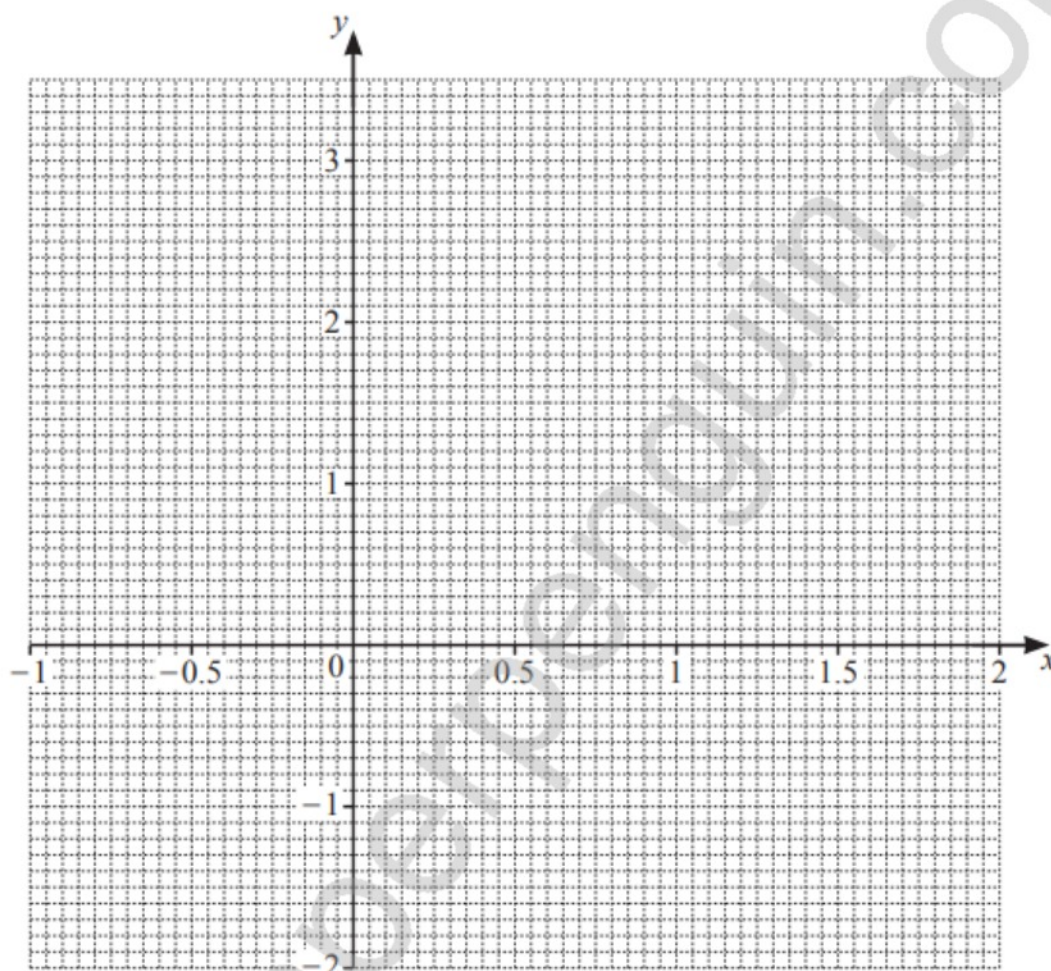
- 2 The table shows some values for $y = 2 \times 0.5^x - 1$.

x	-1	-0.5	0	0.5	1	1.5	2
y	3	1.83		0.41	0	-0.29	

(a) (i) Complete the table.

[2]

(ii) On the grid, draw the graph of $y = 2 \times 0.5^x - 1$ for $-1 \leq x \leq 2$.



[4]

(b) By drawing a suitable straight line, solve the equation $2 \times 0.5^x + 2x - 3.5 = 0$ for $-1 \leq x \leq 2$.

$x = \dots\dots\dots$ [3]

(c) There are no solutions to the equation $2 \times 0.5^x - 1 = k$ where k is an integer.

Complete the following statements.

The highest possible value of k is

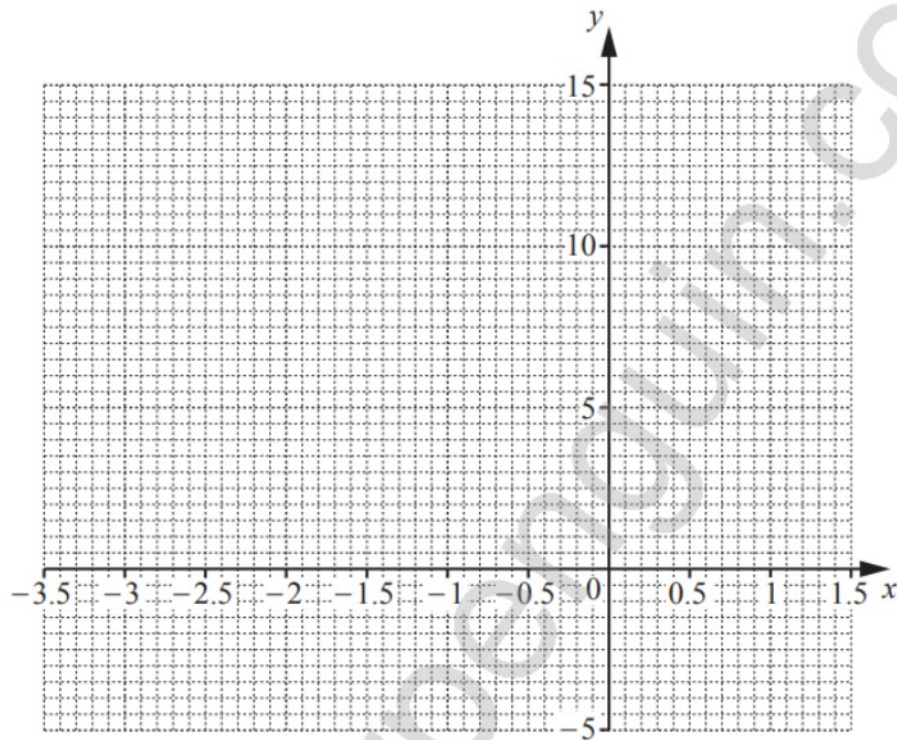
The equation of the asymptote to the graph of $y = 2 \times 0.5^x - 1$ is [2]

- 2 The table shows some values for $y = x^3 + 3x^2 + 2$.

x	-3.5	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5
y	-4.1		5.1	6	5.4	4	2.6		2.9		12.1

(a) Complete the table. [3]

(b) On the grid, draw the graph of $y = x^3 + 3x^2 + 2$ for $-3.5 \leq x \leq 1.5$.



[4]

(c) Use your graph to solve the equation $x^3 + 3x^2 + 2 = 0$ for $-3.5 \leq x \leq 1.5$.

$x = \dots\dots\dots$ [1]

(d) By drawing a suitable straight line, solve the equation $x^3 + 3x^2 + 2x + 2 = 0$ for $-3.5 \leq x \leq 1.5$.

$x = \dots\dots\dots$ [2]

(e) For $-3.5 \leq x \leq 1.5$, the equation $x^3 + 3x^2 + 2 = k$ has three solutions and k is an integer.

Write down a possible value of k .

$k = \dots\dots\dots$ [1]

- 5 The table shows some values for $y = x^3 - 3x^2 + 3$.

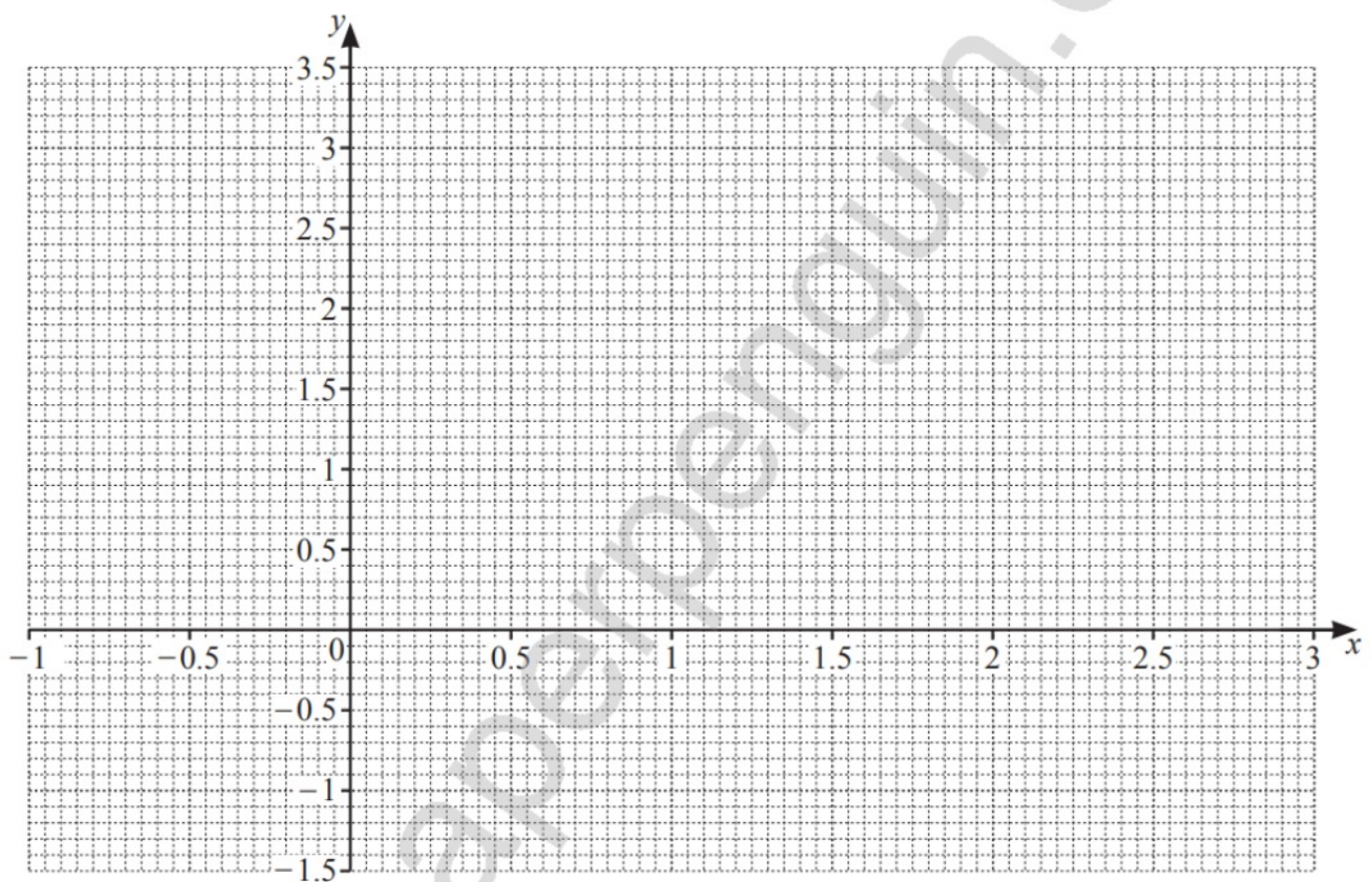
x	-1	-0.5	0	0.5	1	1.5	2	2.5	3
y		2.125	3	2.375	1		-1	-0.125	

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = x^3 - 3x^2 + 3$ for $-1 \leq x \leq 3$.

(b) On the grid, draw the graph of $y = x^3 - 3x^2 + 3$ for $-1 \leq x \leq 3$.



[4]

(c) By drawing a suitable straight line on the grid, solve the equation $x^3 - 3x^2 + x + 1 = 0$.

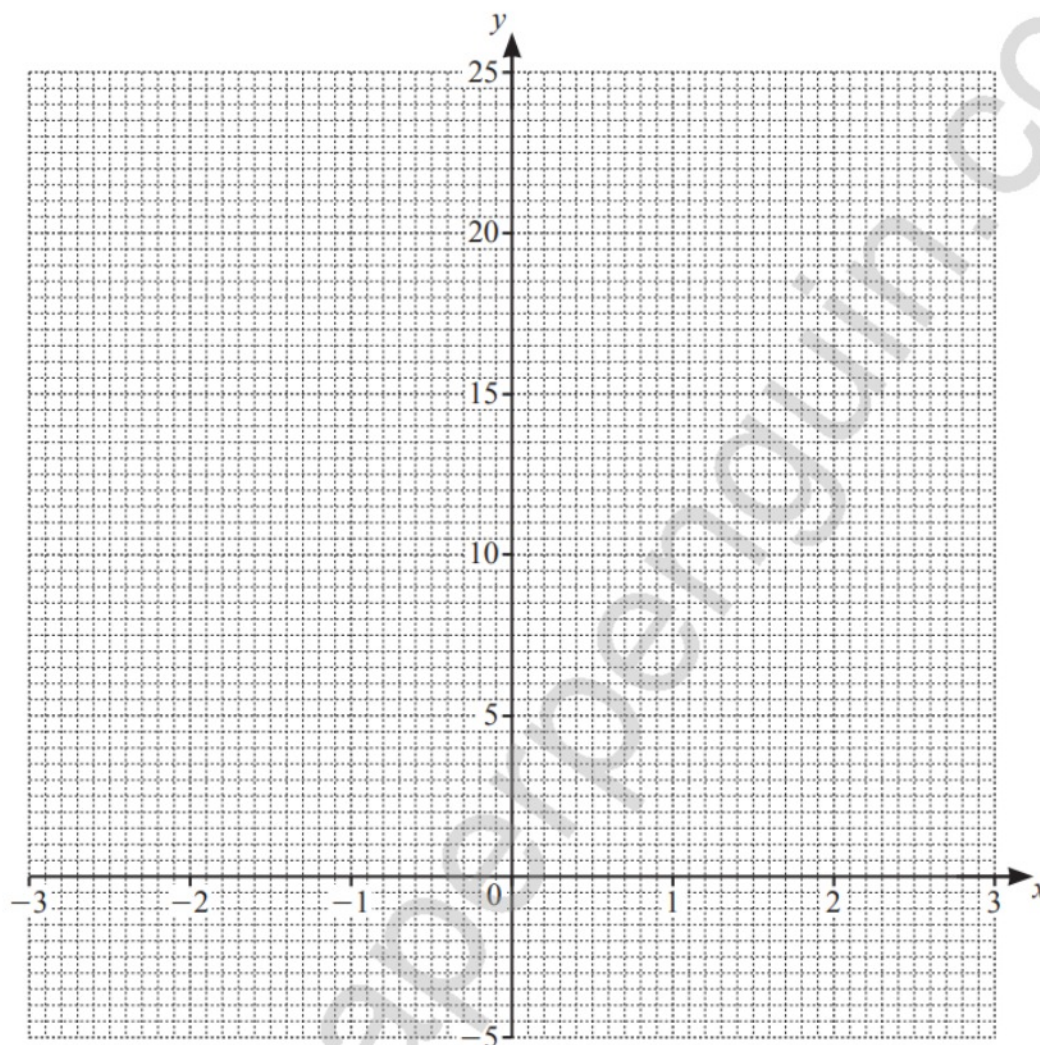
- 3 The table shows some values for $y = x^3 + x^2 - 5x$.

x	-3	-2	-1.5	-1	0	1	1.5	2	2.5	3
y	-3	6	6.4		0		-1.9	2	9.4	

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = x^3 + x^2 - 5x$ for $-3 \leq x \leq 3$.



[4]

(c) Use your graph to solve the equation $x^3 + x^2 - 5x = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

(e) Write down the largest value of the integer, k , so that the equation $x^3 + x^2 - 5x = k$ has three solutions for $-3 \leq x \leq 3$.

$k = \dots\dots\dots$ [1]

$$y = x^2 + \frac{1}{x}, \quad x \neq 0$$

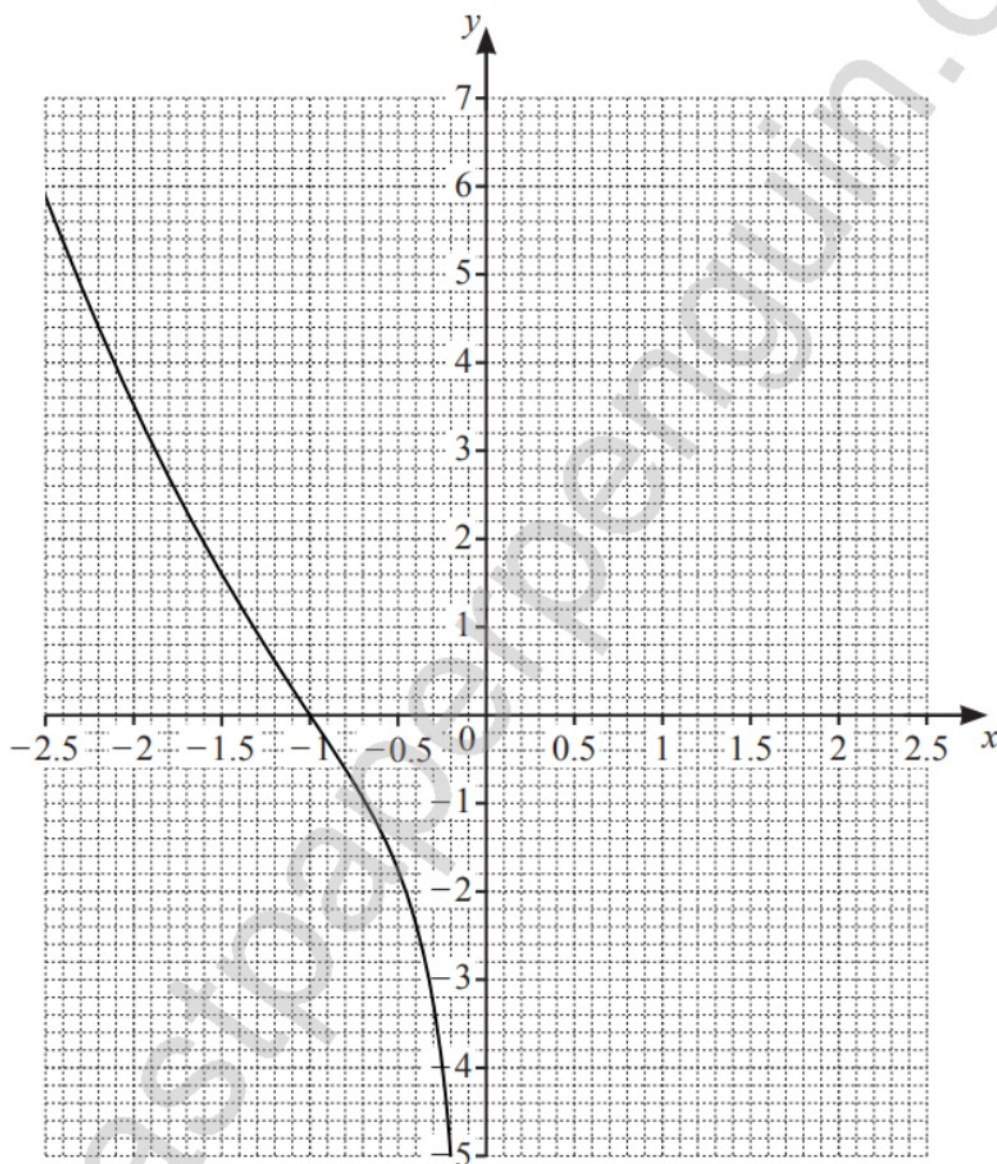
(a) Complete the table.

x	0.2	0.3	0.5	1	1.5	2	2.5
y	5.0	3.4	2.3		2.9		6.7

[2]

(b) On the grid, draw the graph of $y = x^2 + \frac{1}{x}$ for $0.2 \leq x \leq 2.5$.

The graph of $y = x^2 + \frac{1}{x}$ for $-2.5 \leq x \leq -0.2$ has been drawn for you.



[4]

(c) By drawing suitable straight lines on the grid, solve the following equations.

(i) $x^2 + \frac{1}{x} = -2$

$x =$ [1]

(ii) $x^2 + \frac{1}{x} + x - 1 = 0$

$x =$ [2]

(d) k is an integer and the equation $x^2 + \frac{1}{x} = k$ has three solutions.

Write down a possible value of k .

$k =$ [1]

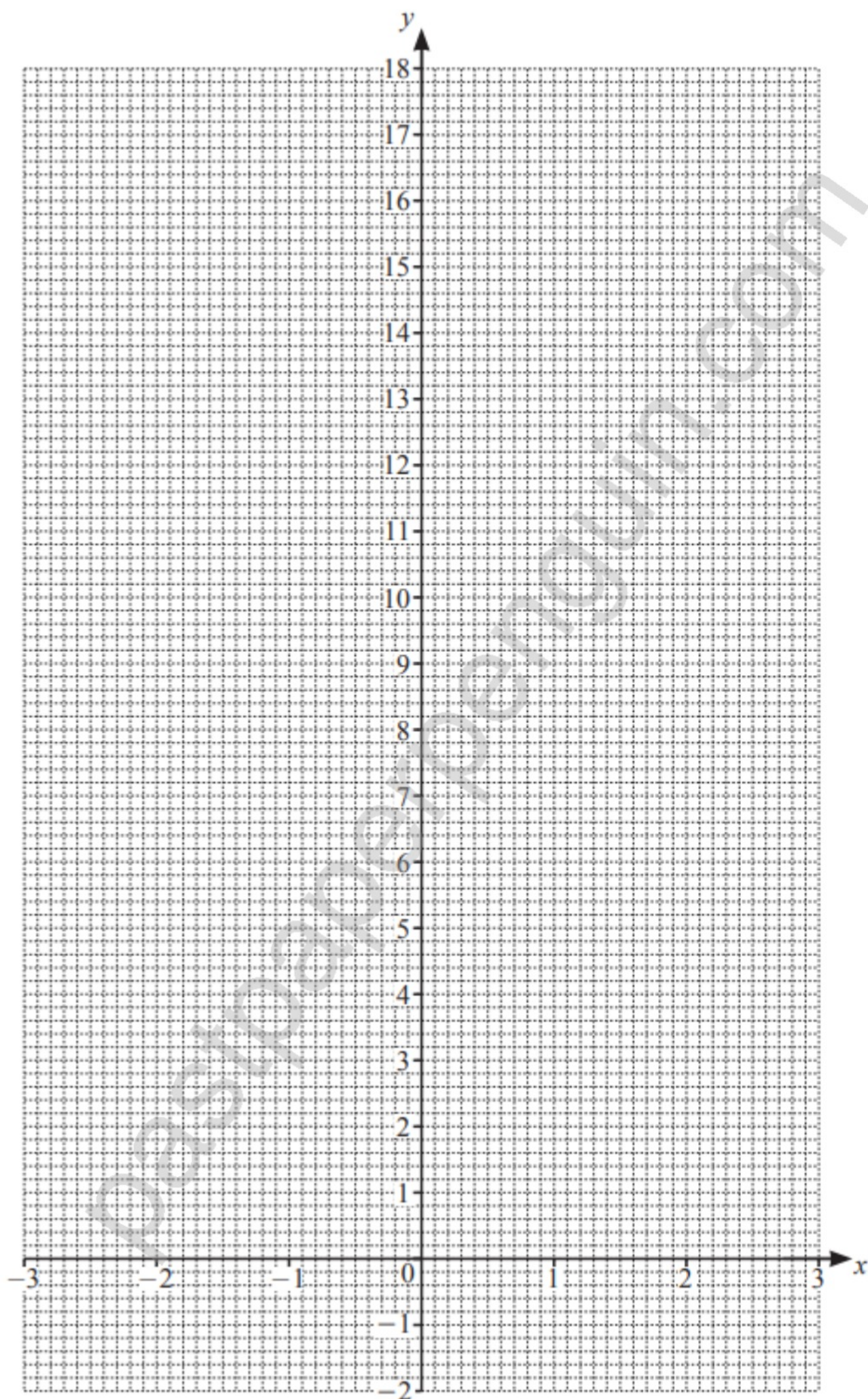
5 The table shows some values of $y = \frac{x^2}{2} + \frac{1}{x^2} - \frac{2}{x}$, $x \neq 0$.

x	-3	-2	-1	-0.5	-0.3		0.2	0.3	0.5	1	2	3
y	5.3	3.3		8.1	17.8			4.5	0.1	-0.5	1.3	

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = \frac{x^2}{2} + \frac{1}{x^2} - \frac{2}{x}$ for $-3 \leq x \leq -0.3$ and $0.2 \leq x \leq 3$.



- (d) Find the smallest positive integer value of k for which $\frac{x^2}{2} + \frac{1}{x^2} - \frac{2}{x} = k$ has two solutions for $-3 \leq x \leq -0.3$ and $0.2 \leq x \leq 3$.

..... [1]

- (e) (i) By drawing a suitable straight line, solve $\frac{x^2}{2} + \frac{1}{x^2} - \frac{2}{x} = 3x + 1$ for $-3 \leq x \leq -0.3$ and $0.2 \leq x \leq 3$.

$x =$ [3]