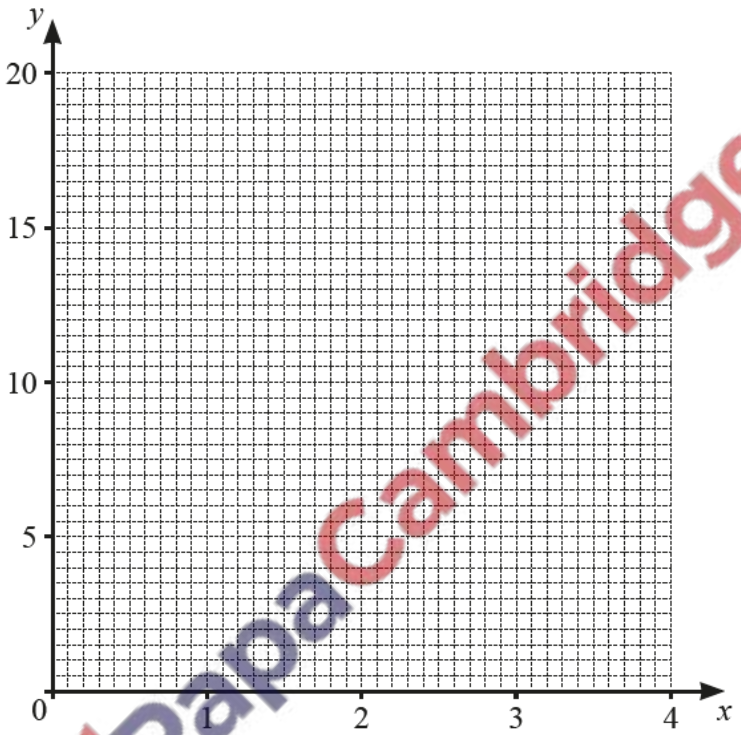
Graphs of functions – 2021 O Level Math D

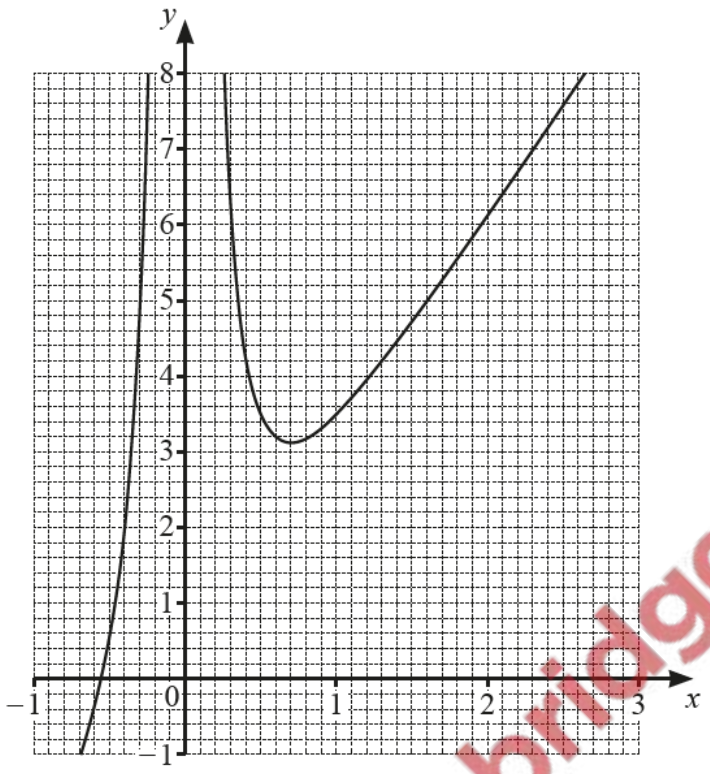
1. Nov/2021/Paper_21/No.7

(a) On the grid below, draw the graph of $y = 2^x$ for $0 \leqslant x \leqslant 4$.



[4]

(b)



The diagram shows the graph of $y = \frac{1}{2x^2} + 3x$ for $-1 \leqslant x \leqslant 3$.

(i) By drawing a tangent, estimate the gradient of the curve at $x = 0.5$.

..... [2]

(ii) Use the graph to estimate the solution of the equation $\frac{1}{2x^2} + 3x = 2$.

$x =$ ..... [1]

(iii) By drawing a suitable line on the grid, estimate the solutions of the equation $\frac{1}{2x^2} = 7 - 4x$.

$x =$ ..... , $x =$ ..... , $x =$ ..... [4]

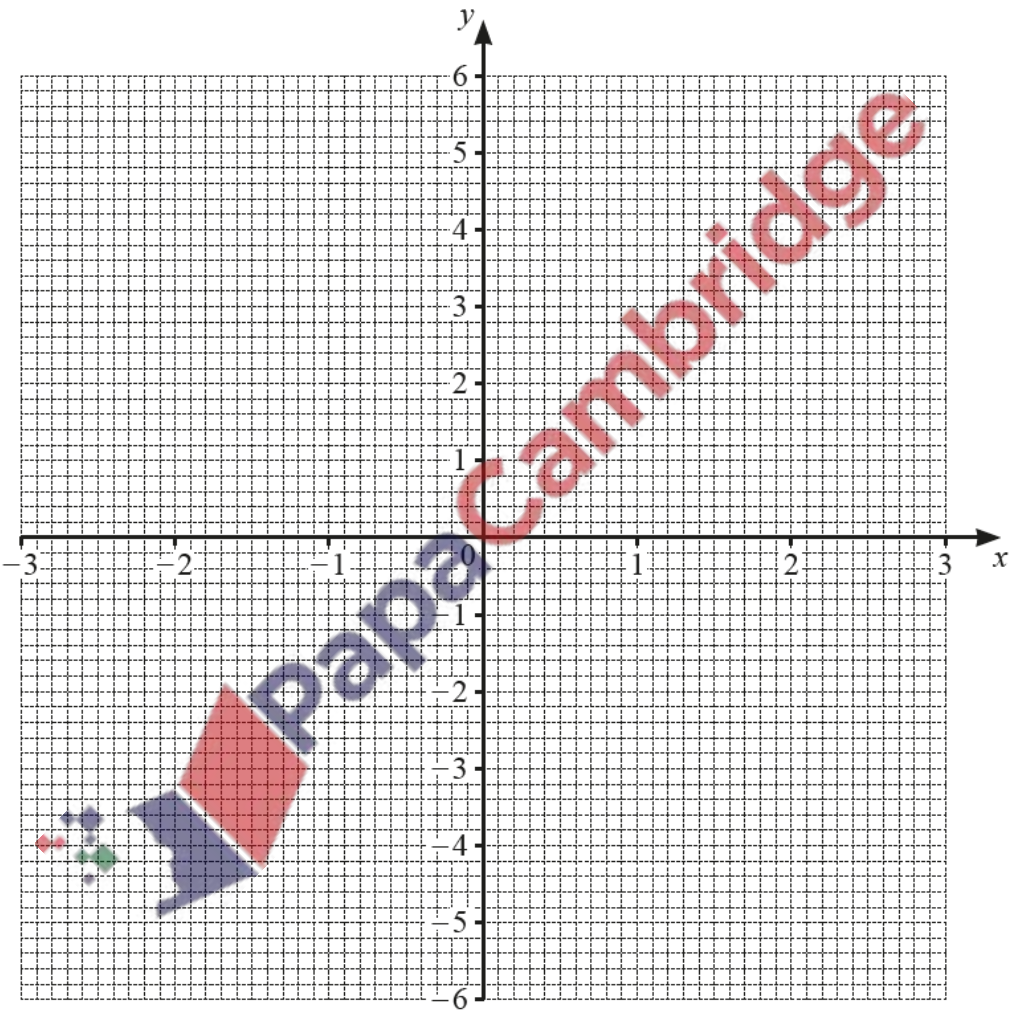
2. Nov/2021/Paper_22/No.3

(a) Complete the table for $y = \frac{x^3}{2} - 3x - 1$.

x	-3	-2	-1	0	1	2	3
y		1	1.5	-1	-3.5	-3	3.5

[1]

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



[3]

(c) Use your graph to explain why $x^3 - 6x - 2 = 6$ has only one solution.

..... [2]

(d) Line L passes through the points (1, 1) and $(-2, -1)$.

(i) On the grid, draw line L. [1]

(ii) Work out the gradient of line L.

..... [2]

(iii) Find the x-coordinates of the points where line L intersects the curve $y = \frac{x^3}{2} - 3x - 1$.

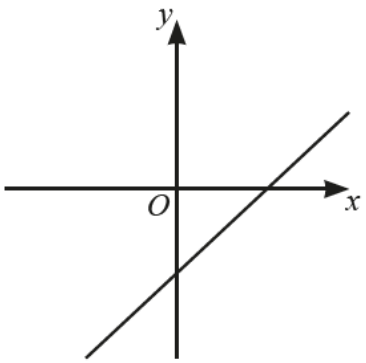
$x =$ ..... , $x =$ ..... , $x =$ ..... [2]

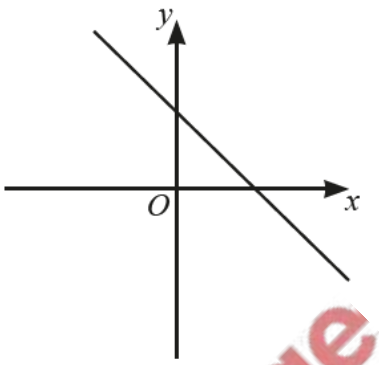
3. June/2021/Paper_21/No.7

(a) $y = 2x+1$ $y = 2x-1$ $y = -2x+1$ $y = -2x-1$

The diagrams below show sketches of two of these lines.

Write the correct equation below each diagram.

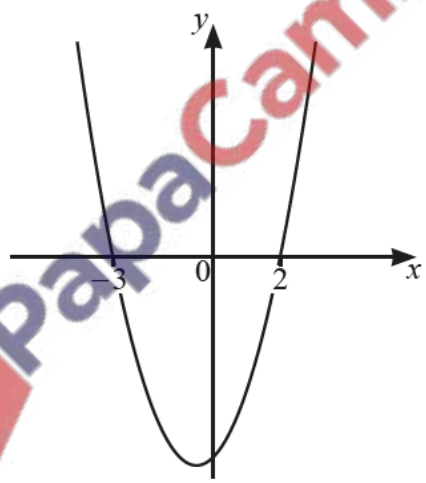




....

[2]

(b)

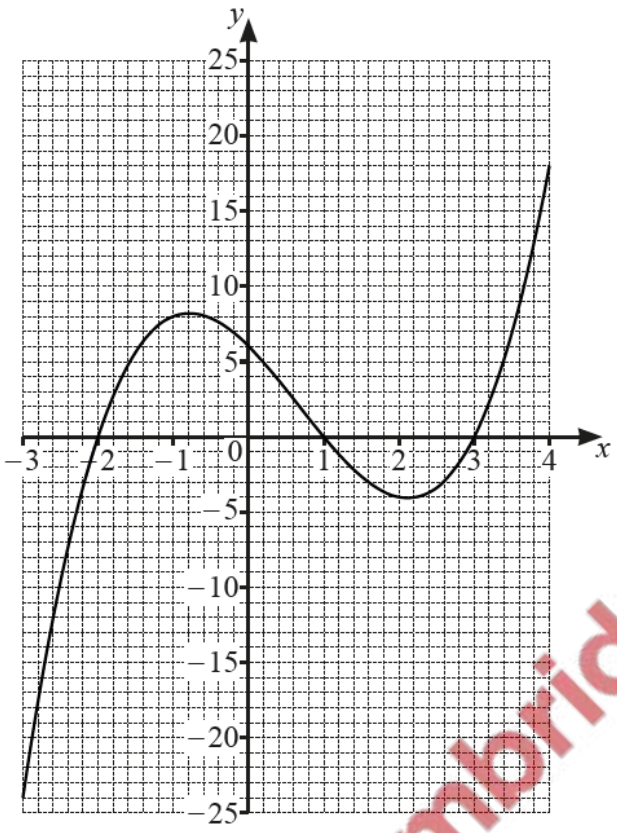


This diagram shows a sketch of the graph of $y = x^2 + ax + b$.

Find the value of a and the value of b.

$a =$ ..... $b =$ ..... [2]

(c)



The grid shows the graph of $y = x^3 - 2x^2 - 5x + 6$.

(i) $x^3 - 2x^2 - 5x + 6 = k$ has exactly 2 solutions.

Use the graph to find the possible values of k.

..... [2]

(ii) By drawing a suitable line on the grid, find the solutions of $x^3 - 2x^2 - 7x + 5 = 0$.

$x =$ ..... , $x =$ ..... , $x =$ ..... [4]

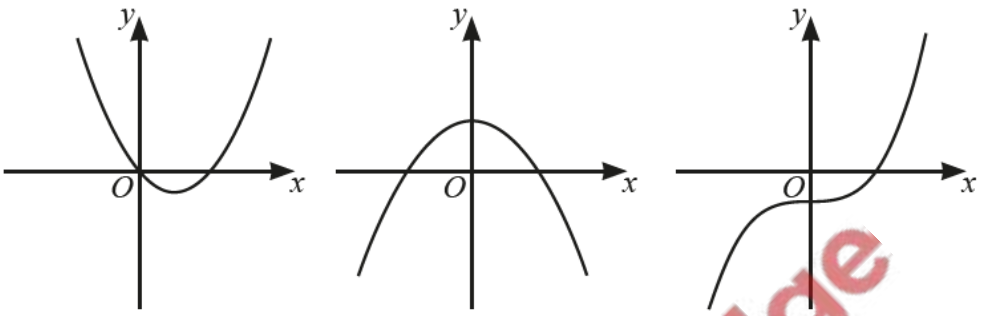
4. June/2021/Paper_22/No.6b

(b) Here are the equations of five curves.

$y = 2 - x^2$ $y = x^3 - 2$ $y = x^2 + 2x - 8$ $y = x^3 - 3x$ $y = x^2 - 3x$

Sketches of three of these curves are drawn below.

Write the correct equation underneath each sketch.



.... [3]