Graphs of functions – 2020 O Level Math D

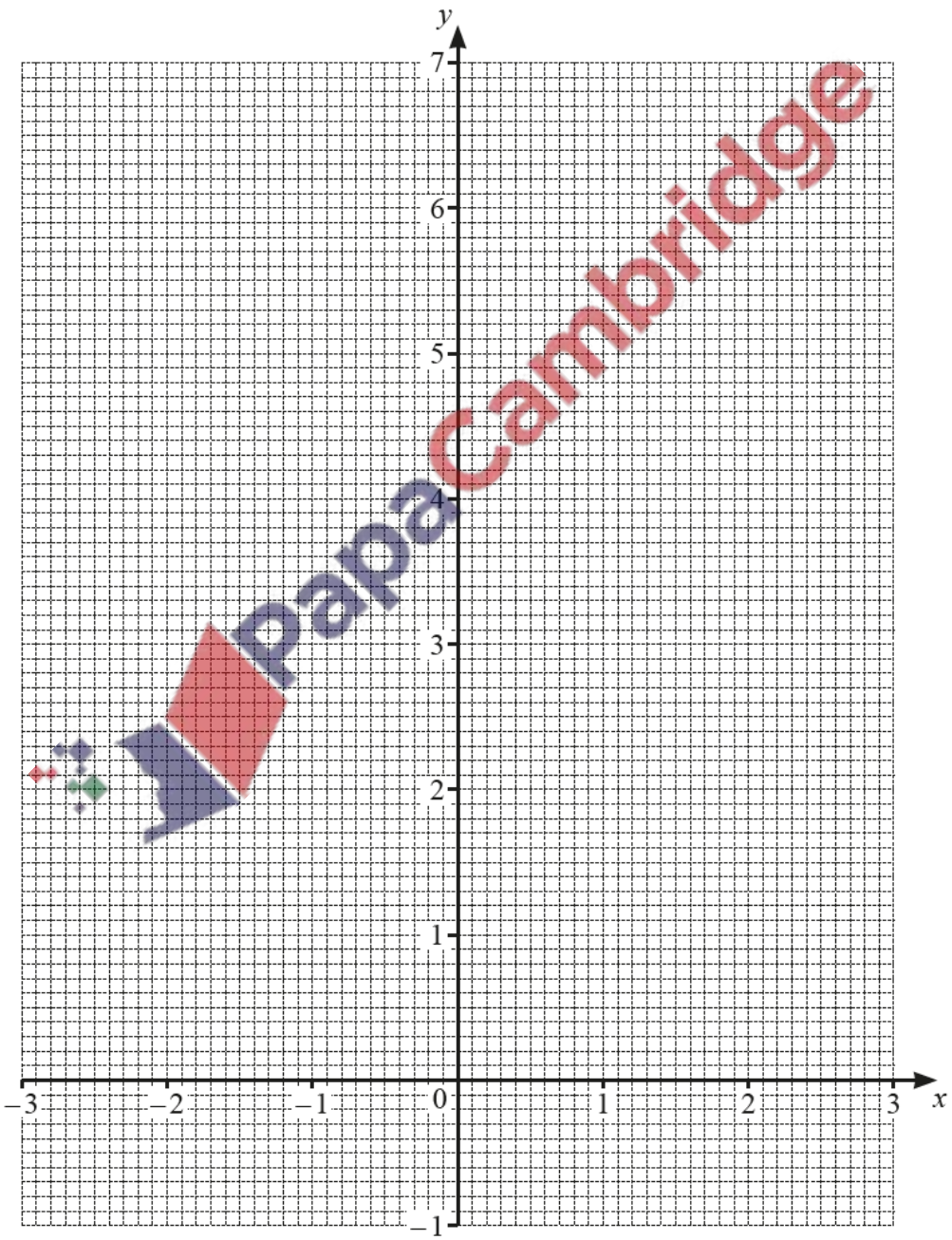
1. Nov/2020/Paper_21/No.4

(a) Complete the table for $y = \frac{4}{5} \times 2^x$.

x	-3	-2	-1	0	1	2	3
y		0.2	0.4	0.8	1.6	3.2	6.4

[1]

(b) On the grid, draw the graph of $y = \frac{4}{5} \times 2^x$ for $-3 \leqslant x \leqslant 3$.



[3]

(c) By drawing a tangent, estimate the gradient of $y = \frac{4}{5} \times 2^x$ when $x = 2$.

..... [2]

(d) Use your graph to estimate the solution of the equation $4 \times 2^x = 5$.

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

2. Nov/2020/Paper_22/No.3

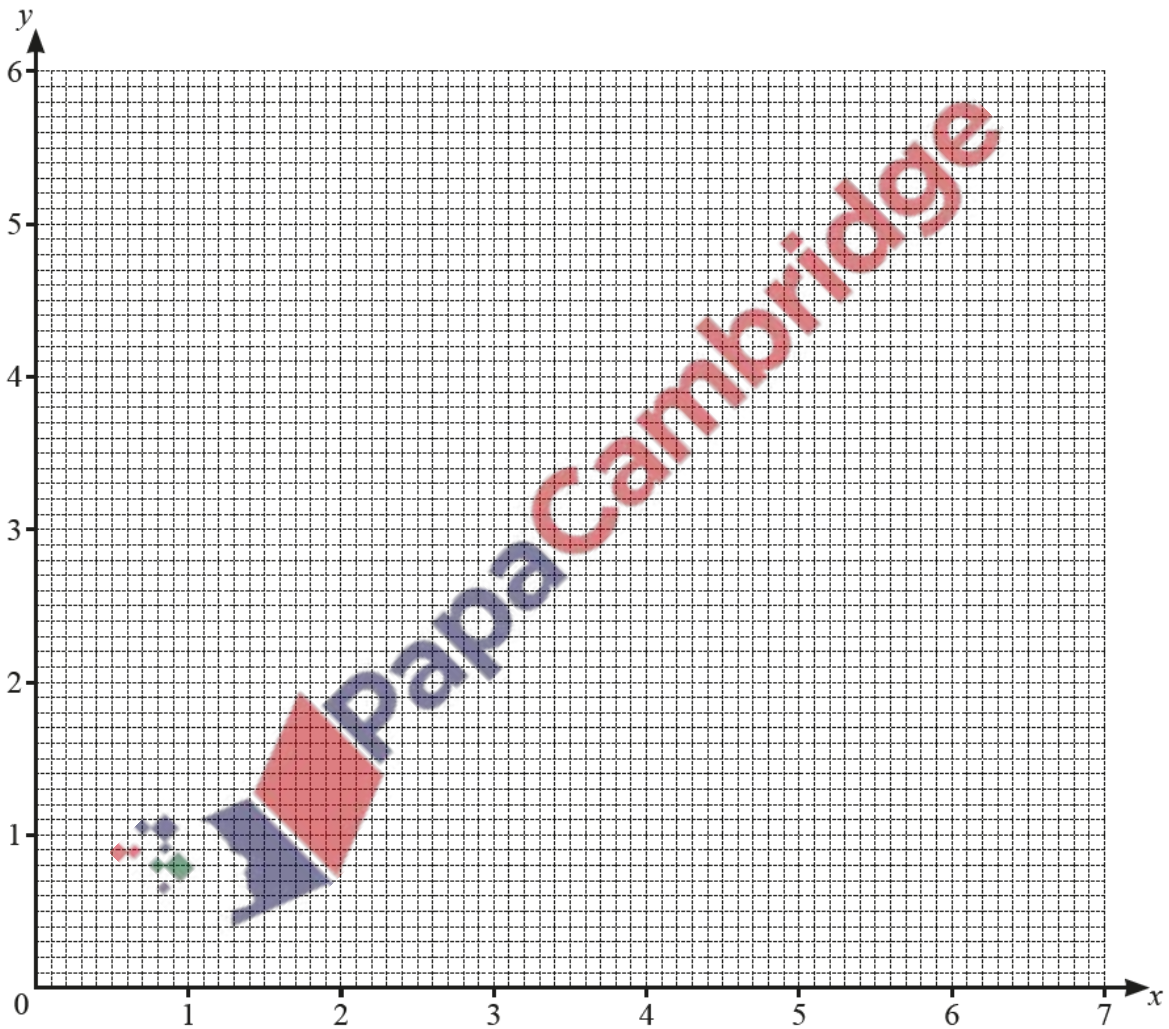
(a) Complete the table for $y = \frac{x}{4} + \frac{2}{x}$.

The values of y are given correct to 2 decimal places where appropriate.

x	0.5	1	1.5	2	3	4	5	6	7
y	4.13	2.25	1.71	1.5	1.42	1.5	1.65	1.83	

[1]

(b) On the grid, draw the graph of $y = \frac{x}{4} + \frac{2}{x}$ for $0.5 \leqslant x \leqslant 7$.



[3]

(c) By drawing a tangent, estimate the gradient of $y = \frac{x}{4} + \frac{2}{x}$ when $x = 1$.

..... [2]

(d) **(i)** On the grid, draw the graph of $2y + x = 6$.

[2]

(ii) Write down the x-coordinates of the points of intersection of the graphs of $2y + x = 6$ and $y = \frac{x}{4} + \frac{2}{x}$.

$x =$ ..... and $x =$ ..... [2]

(iii) These x-coordinates are the solutions of the equation $3x^2 + Ax + B = 0$.

Use $2y + x = 6$ and $y = \frac{x}{4} + \frac{2}{x}$ to find the value of A and the value of B.

$A =$ .....

$B =$ ..... [3]

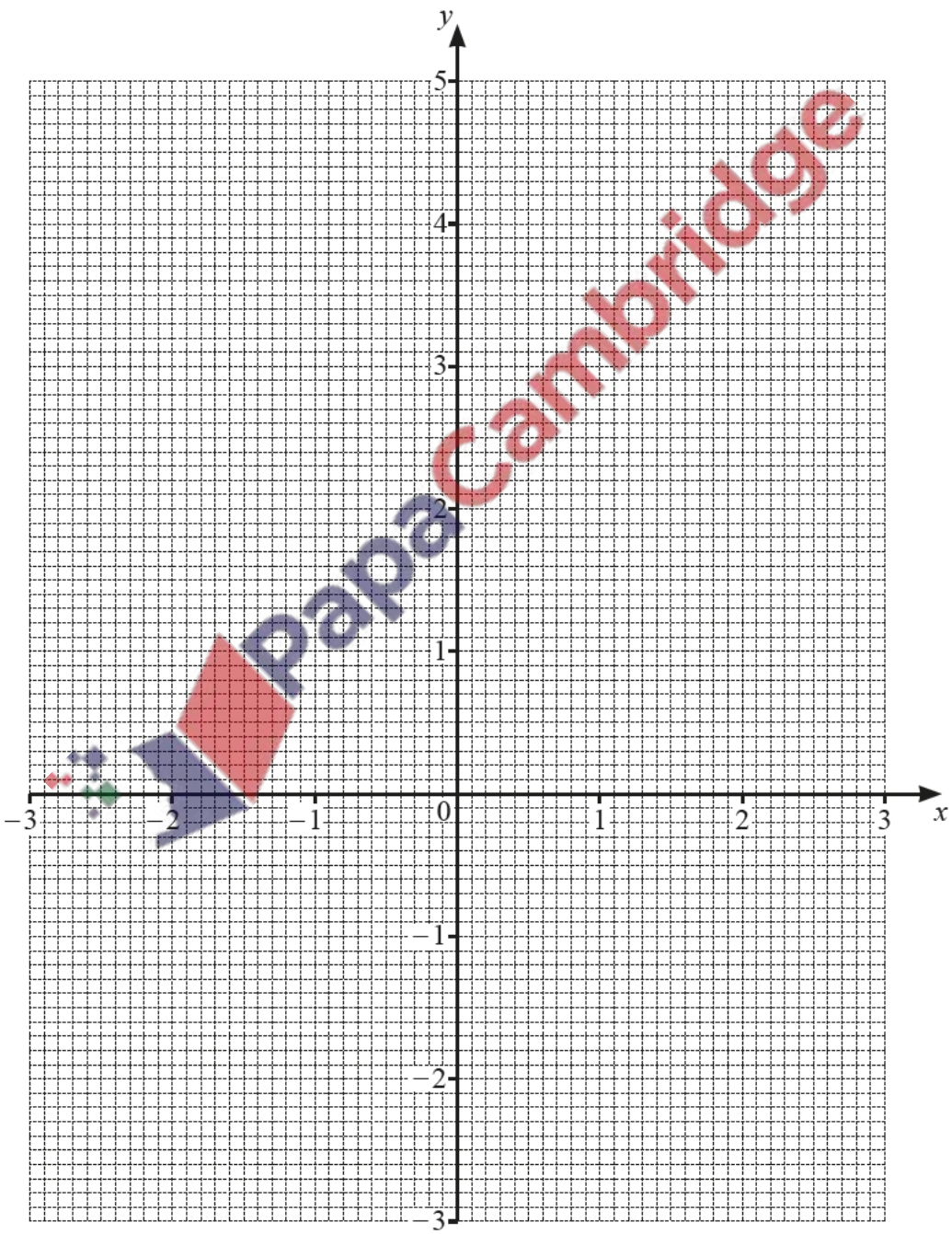
3. June/2020/Paper_21/No.6

(a) The table shows some values for $y = \frac{x^3}{4} - x + 1$.

x	-3	-2	-1	0	1	2	3
y	-2.75	1	1.75	1	0.25	1	

(i) Complete the table. [1]

(ii) Draw the graph of $y = \frac{x^3}{4} - x + 1$ for $-3 \leqslant x \leqslant 3$.



[3]

(iii) **(a)** On the same grid, draw the graph of $y = \frac{1}{3}x + 1$. [2]

(b) Use your graph to find all the values of x where $y = \frac{1}{3}x + 1$ crosses $y = \frac{x^3}{4} - x + 1$.

..... [2]

(c) The values of x where $y = \frac{1}{3}x + 1$ crosses $y = \frac{x^3}{4} - x + 1$ are the solutions of the equation $Ax^3 = Bx$.

Given that A and B are integers, find A and B.

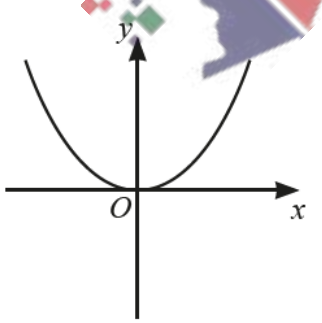
$A =$ ..... $B =$ ..... [2]

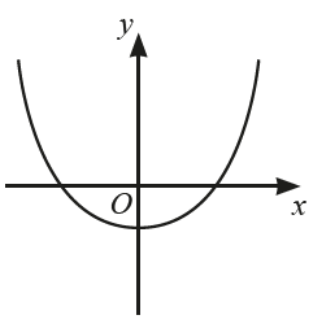
(b) Here are four equations.

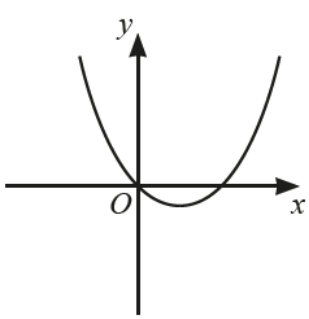
$y = x^2 - 2x$ $y = 2x^2 - 2$ $y = x^2 + 2x$ $y = 2x^2$

The graphs of three of these equations are sketched below.

Write the correct equation below each graph.







.... [2]

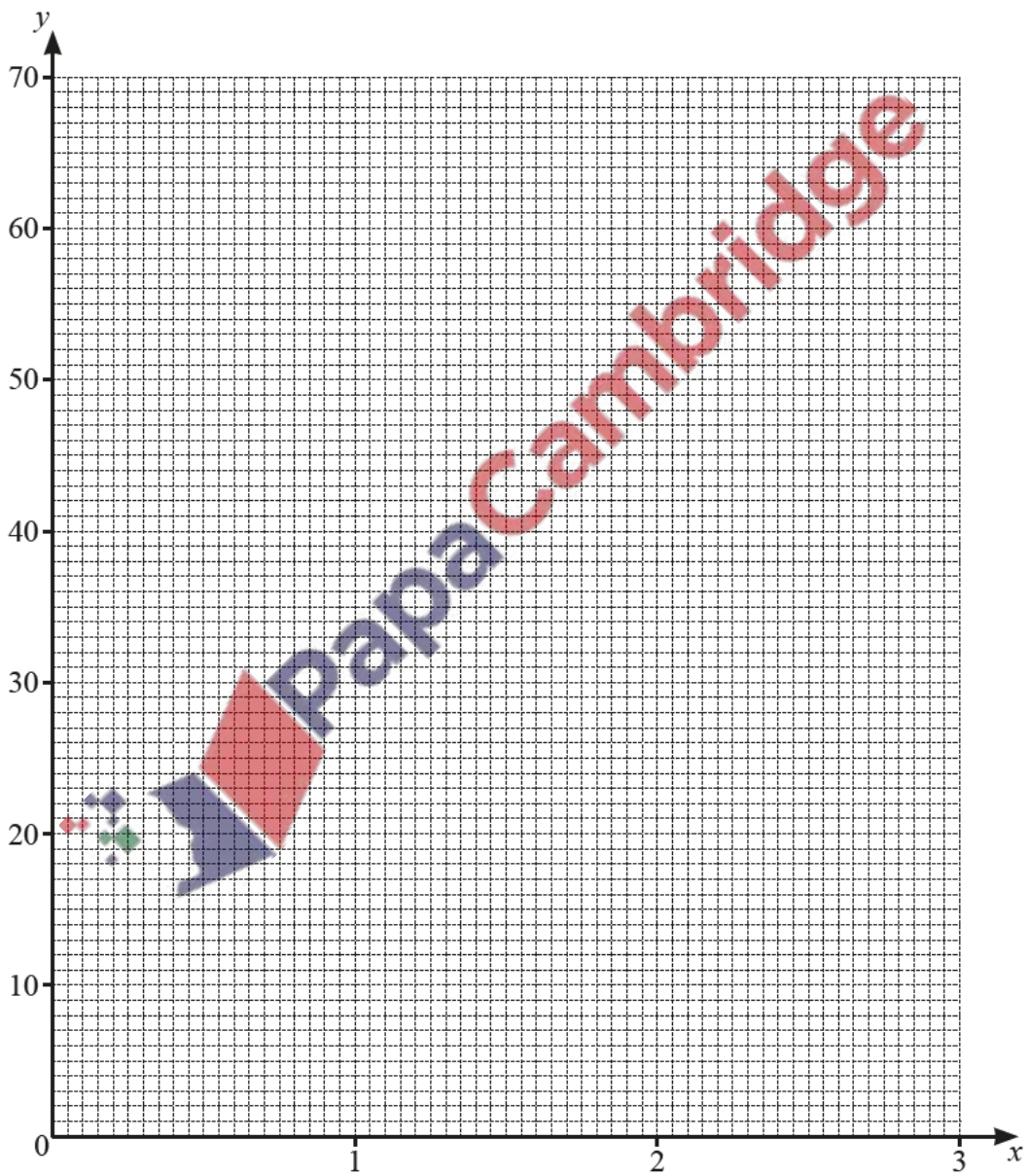
4. June/2020/Paper_22/No.7

(a) The table shows some values for $y = 4^x$.

x	0	0.5	1	1.5	2	2.5	3
y			4	8	16	32	64

(i) Complete the table. [1]

(ii) Draw the graph of $y = 4^x$ for $0 \leqslant x \leqslant 3$.



[3]

(iii) By drawing a tangent, estimate the gradient of the curve when $x = 2$.

..... [2]

(iv) The solutions of the equation $3(4^x) + ax + b = 0$ can be found from the points of intersection of $y = 4^x$ and $y = 20x - 12$.

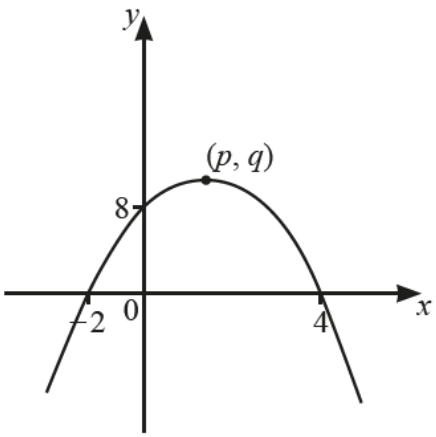
(a) Find the value of a and the value of b.

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

(b) By drawing the line $y = 20x - 12$ on the grid opposite, find all the solutions of $3(4^x) + ax + b = 0$.

..... [3]

(b) Here is a sketch of the graph of a quadratic function.



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The curve has a maximum point (p, q).

Find the value of p and the value of q.

$p =$ ..... $q =$ ..... [3]