Algebra functions – A2 Mathematics P1

1. June/2022/Paper_7357/01/No.3

The curve

$$y = \log_4 x$$

is transformed by a stretch, scale factor 2, parallel to the y-axis.

State the equation of the curve after it has been transformed.

Circle your answer.

[1 mark]

$$y = \frac{1}{2}\log_4 x \qquad y = 2\log_4 x \qquad y = \log_4 2x \qquad y = \log_8 x$$

2. June/2022/Paper_7357/01/No.4

The graph of

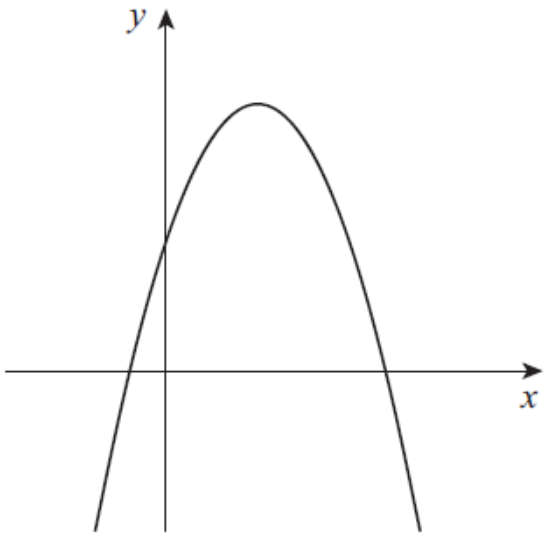
$$y = \mathrm{f}(x)$$

where

$$\mathrm{f}(x) = ax^2 + bx + c$$

is shown in **Figure 1**.

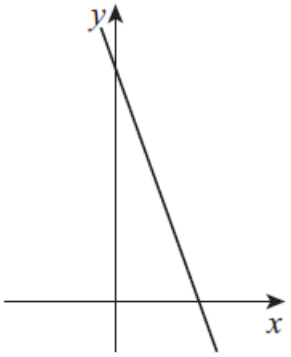
Figure 1



Which of the following shows the graph of $y = f'(x)$?

Tick (✓) **one** box.

[1 mark]



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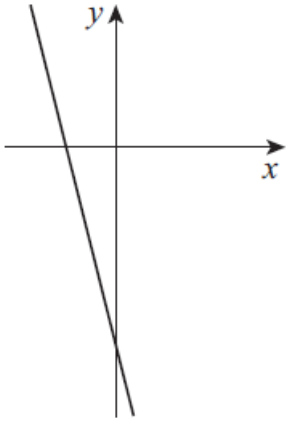

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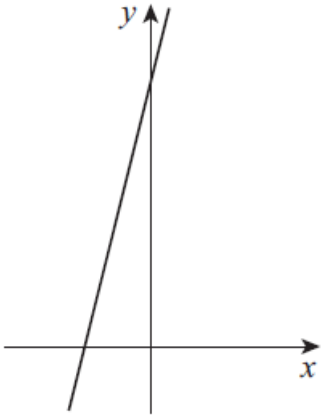

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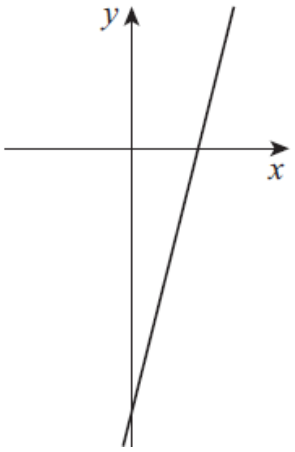


3. June/2022/Paper_7357/01/No.11

The polynomial $\mathrm{p}(x)$ is given by

$$\mathrm{p}(x) = x^3 + (b+2)x^2 + 2(b+2)x + 8$$

where b is a constant.

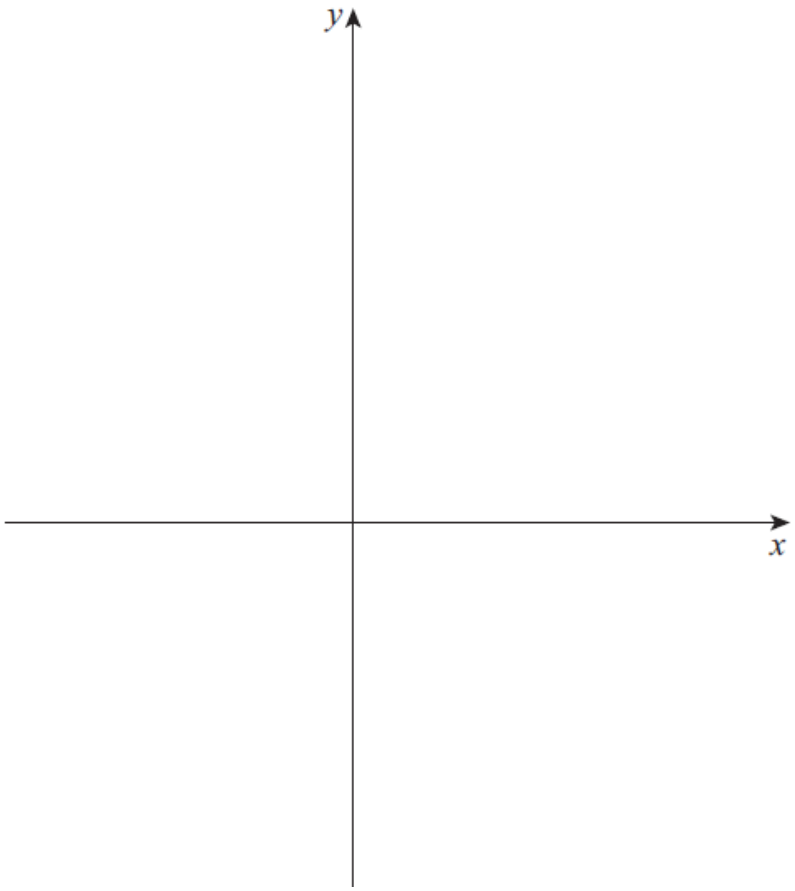
(a) Use the factor theorem to prove that $(x+2)$ is a factor of $\mathrm{p}(x)$ for **all** values of b.

[3 marks]

(b) The graph of $y = \mathrm{p}(x)$ meets the x-axis at exactly two points.

(b) (i) Sketch a possible graph of $y = \mathrm{p}(x)$

[3 marks]



(b) (ii) Given $p(x)$ can be written as

$$p(x) = (x + 2)(x^2 + bx + 4)$$

find the value of b.

Fully justify your answer.

[4 marks]