Cambridge International AS & A Level

Mathematics   9709/12

Paper 1 Pure Mathematics 1   **May/June 2024**

Question No (2)

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The curve $y = x^2$ is transformed to the curve $y = 4(x-3)^2 - 8$.

Describe fully a sequence of transformations that have been combined, making clear the order in which the transformations have been applied.

Solution:

given curve

$$y = x^2$$

Translate 3 units to the right or $\binom{3}{0}$ in the x-direction

$$\Rightarrow \quad y = (x-3)^2$$

stretch vertically by a scale factor 4

$$\Rightarrow \quad y = 4(x-2)^2$$

vertical translation of the curve 8 units down or $\binom{0}{-8}$ parallel to the y-axis

$$\Rightarrow \quad y = 4(x-2)^2 - 8$$