

AQA, Edexcel, OCR, MEI

A Level

A Level Mathematics

C1 Curve Sketching

Name:

M M E

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Total Marks: /20

1. Consider the function $f(x) = x^2 + x - 6$:

(a) Find the solutions to the equation $f(x) = 0$. [2]

(b) Compute $f(0)$. [1]

(c) Write $f(x)$ in the form $f(x) = (x + a)^2 + b$ and hence deduce that the graph of $f(x)$ has a line of symmetry at $x = -\frac{1}{2}$. [2]

(d) Using your answer to (c), give the coordinates of the minimum point of $f(x)$. [1]

(e) Sketch $f(x)$. [1]

(f) The curve is translated by $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$. Show that the translated function $g(x)$ is given by $g(x) = x^2 - 5x + 1$. [3]

2. Consider the function $f(x) = x^3 + 3x^2 - x - 3$:

(a) Compute $f(-3)$. [1]

(b) Hence or otherwise factorise $f(x)$. [4]

(c) Sketch $f(x)$. [1]

(d) Let $g(x) = f(x + 2) + 1$. Show that $g(x) = x^3 + 9x^2 + 23x + 16$. [3]

(e) Describe the transformation that takes $f(x)$ to $g(x)$. [1]