

Core 1 Polynomials Questions

6 The polynomial $p(x)$ is given by

$$p(x) = x^3 + x^2 - 10x + 8$$

- (a) (i) Using the factor theorem, show that $x - 2$ is a factor of $p(x)$. (2 marks)
- (ii) Hence express $p(x)$ as the product of three linear factors. (3 marks)
- (b) Sketch the curve with equation $y = x^3 + x^2 - 10x + 8$, showing the coordinates of the points where the curve cuts the axes. (4 marks)
- (You are not required to calculate the coordinates of the stationary points.)
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6 The polynomial $p(x)$ is given by $p(x) = x^3 - 4x^2 + 3x$.

- (a) Use the Factor Theorem to show that $x - 3$ is a factor of $p(x)$. (2 marks)
- (b) Express $p(x)$ as the product of three linear factors. (2 marks)
- (c) (i) Use the Remainder Theorem to find the remainder, r , when $p(x)$ is divided by $x - 2$. (2 marks)
- (ii) Using algebraic division, or otherwise, express $p(x)$ in the form

$$(x - 2)(x^2 + ax + b) + r$$

where a , b and r are constants. (4 marks)

1 The polynomial $p(x)$ is given by

$$p(x) = x^3 - 4x^2 - 7x + k$$

where k is a constant.

- (a) (i) Given that $x + 2$ is a factor of $p(x)$, show that $k = 10$. (2 marks)
- (ii) Express $p(x)$ as the product of three linear factors. (3 marks)
- (b) Use the Remainder Theorem to find the remainder when $p(x)$ is divided by $x - 3$. (2 marks)
- (c) Sketch the curve with equation $y = x^3 - 4x^2 - 7x + 10$, indicating the values where the curve crosses the x -axis and the y -axis. (You are **not** required to find the coordinates of the stationary points.) (4 marks)

6 (a) The polynomial $f(x)$ is given by $f(x) = x^3 + 4x - 5$.

(i) Use the Factor Theorem to show that $x - 1$ is a factor of $f(x)$. *(2 marks)*

(ii) Express $f(x)$ in the form $(x - 1)(x^2 + px + q)$, where p and q are integers. *(2 marks)*

(iii) Hence show that the equation $f(x) = 0$ has exactly one real root and state its value. *(3 marks)*
