

Total = 25 marks

Q1. (a) Show that $(x + 1)$ is a factor of $x^3 - 13x - 12$. 3 marks

(b) Hence factorise fully $x^3 - 13x - 12$ 2 marks

Q2. Given the polynomial $x^3 - 4x^2 + ax + b$.

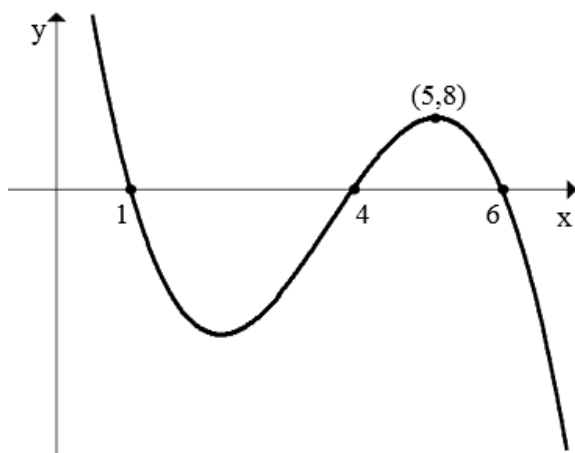
If $(x - 1)$ is a factor and

The remainder is -12 when divided by $(x - 2)$

(i) Find the values of a and b 4 marks

(ii) Hence solve $x^3 - 4x^2 + ax + b = 0$ 4 marks

Q3. State the equation of the function shown 3 marks



Q4.

Functions f , g and h are defined on the set of real numbers by

- $f(x) = x^3 - 1$
- $g(x) = 3x + 1$
- $h(x) = 4x - 5$.

(a) Find $g(f(x))$. 2

(b) Show that $g(f(x)) + xh(x) = 3x^3 + 4x^2 - 5x - 2$. 1

(c) (i) Show that $(x - 1)$ is a factor of $3x^3 + 4x^2 - 5x - 2$.

(ii) Factorise $3x^3 + 4x^2 - 5x - 2$ fully. 5

(d) Hence solve $g(f(x)) + xh(x) = 0$. 1