

Factorising Polynomials

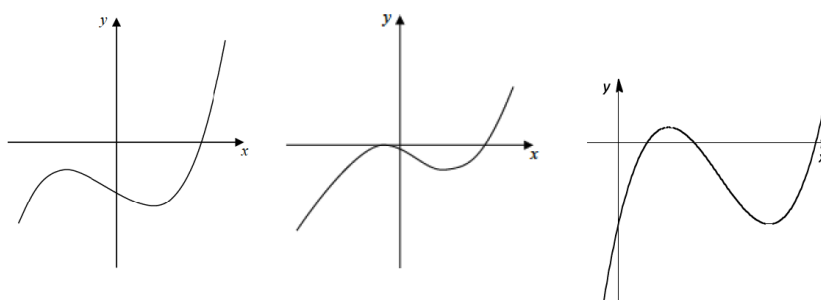
Essential information

Polynomial function of degree n is of the form

$$a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x + a_0$$

where $a_0, a_1, \dots, a_n$ are real numbers, and $a_n \neq 0$

Roots of a cubic A cubic polynomial can have 1, 2 or 3 roots as shown in the diagrams below.



Factor Theorem If $P(x)$ is a polynomial of degree n and has a zero $x - a$, that is $P(a) = 0$, then $(x - a)$ is a factor of $P(x)$ and

$$P(x) = (x - a) \times Q(x) \text{ factor}$$

where $Q(x)$ is a polynomial of degree $(n - 1)$

Remainder Theorem If $P(x)$ is a polynomial of degree n and a is any number, then

$$P(x) = (x - a) \times Q(x) + R$$

where $Q(x)$ is a polynomial of degree $(n - 1)$ and $R = P(a)$