 Polynomials

Polynomials with real coefficients and complex roots

1. Factorise and determine the roots to the polynomial

 is a zero and is a factor of the polynomial.

Divide by to obtain:

Solve

Substitute

Roots of the polynomial:

1. Factorise and determine the roots to the polynomial

Solve

,

and

Roots of the polynomial:

1. Factorise and determine the roots to the polynomial

**Method 1:** Try to find an integer zero/root by considering the polynomial and the product of the roots

Factors of

 if as all coefficients are positive.

Consider

 is a zero and is a factor of the polynomial.

Divide by to obtain:

Solve

, and

 and

Roots of the polynomial:

**Method 2:** Factorise by grouping in pairs

Solve as above.

1. Factorise and determine the roots to the polynomial

Factors of

Try to find an integer zero/root by inspection:

 is a zero and is a factor of the polynomial.

Divide by to obtain:

Try to find an integer zero/root by inspection for

 is a zero and is a factor of the polynomial.

Check is a multiple root

 is a double root.

Divide by to obtain:

Solve

Substitute

Roots of the polynomial:

1. Given is a zero of find all roots of p(x).

Method 1: Using division of the polynomial

The polynomial has real coefficients and therefore the complex roots will always occur in conjugate pairs.

is also a root/zero of the polynomial.

 and are factors of the polynomial.

Divide by to find

Factorise

Roots of the polynomial:

Method 2: Using the sum and products of roots

The polynomial has real coefficients and therefore the complex roots will always occur in conjugate pairs.

is also a root/zero of the polynomial.

Let the other two roots be and

Sum of the roots :

Product of the roots :

Roots of the polynomial: