

Chapter 3 / **Example 27**

Using the roots of a polynomial to factorise

Express the polynomial $f(x) = x^4 - 6x^3 - 19x^2 + 24x$ as a product of linear factors, and check your answer by using your calculator.

Press **[APPS]** :PlySmlt2

Press **[enter]** to enter the main menu and select 1:POLYNOMIAL ROOT FINDER.

Select order 4. In this App, real roots is not an option when the order is ≥ 4 so select type a+bi.

Leave the other options as they are.

```

POLY ROOT FINDER MODE
ORDER  1 2 3 4 5 6 7 8 9 10
REAL-  a+bi  re^(0i)
DEC    FRAC
NORMAL SCI  ENG
FLOAT  0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
[MAIN] [HELP] [NEXT]
  
```

Press **[f5]** NEXT.

Enter the coefficients: 1, -6, -19, 24 and 0.

```

a4x4+a3x3+a2x2+a1x+a0=0
a4=1
a3=-6
a2=-19
a1=24
a0=0
[MAIN] [MODE] [CLEAR] [LOAD] [SOLVE]
  
```

Press **[f5]** SOLVE.

The calculator shows the roots: 8, -3, 1 and 0.

The factorization is: $f(x) = x(x-1)(x+3)(x-8)$.

```

a4x4+a3x3+a2x2+a1x+a0=0
x1=8
x2=-3
x3=1
x4=0
[MAIN] [MODE] [COEFF] [STORE]
  
```