

Consider $f(x) = x^{\text{degree of 4}} + 3x^3 - 5x^2 - 3x + 4$.

Write $f(x)$ as the product of linear and irreducible quadratic factors.

List all zeros of $f(x)$.

$$f(x) = x^4 + 3x^3 - 5x^2 - 3x + 4$$

$$= (x^2 - 1)(x^2 + 3x - 4)$$

$$= (x-1)(x+1)(x+4)(x-1)$$

$$= (x+1)(x+4)(x-1)^2$$

$$x = -1, x = -4, x = 1$$

$$(x-1)(x+1)$$

$$= x^2 + \cancel{x} - \cancel{x} - 1$$

$$= x^2 - 1$$

F ✓
O ✓
I ✓
L ✓

$$\begin{array}{r} \text{*} \\ x^2 - 1 \overline{) \begin{array}{l} x^2 + 3x - 4 \\ x^4 + 3x^3 - 5x^2 - 3x + 4 \\ \hline x^4 - x^2 + 4 \\ \hline 3x^3 - 4x^2 - 3x + 4 \\ \hline 3x^3 - 3x + 4 \\ \hline -4x^2 + 4 \\ \hline -4x^2 + 4 \\ \hline 0 \end{array}} \end{array}$$

D ✓
M ✓
S ✓