6.3 Solving Polynomial Equations

Any n^{th} degree polynomial has n roots.

Roots can be:
① repeated
② rational (can be written as a fraction)
③ irrational (cannot be written as a fraction)
④ imaginary (has i)

Special Note:
  Irrational Roots & imaginary Roots
    $a \pm \sqrt{b}$ $a \pm bi$
    always exist in pairs.

① Solve $x^3 + 3x^2 - 14x - 20 = 0$ & classify the roots.
  degree 3 → 3 roots

PlySmlt2.	Roots	
1: Polynomial Root Finder	-5	rational
	3.236	irrational
$\begin{bmatrix} ORDER\ (degree) \\ a+bi \end{bmatrix}$	-1.236	irrational

GRAPH
  ＊Press F◀▶D (Graph) to see if your decimal roots can be written as a fraction.

② Solve $x^3 - 2x^2 + 3x - 6 = 0$ and classify the roots.

Roots
2	rational
1.732i	imaginary
-1.732i	imaginary

③ Solve $x^4 + 3x^2 - 18 = 0$ and classify the roots. degree 4

Roots
2.449i	imaginary
-2.449i	imaginary
1.732	irrational
-1.732	irrational

YT Solve $x^4 - 14x^2 + 45 = 0$ and classify the roots.