AChor/MHF4U **Name: _____**
Date: _____

Worksheet 2-3: Polynomial Equations

Key Concepts relating to the Factor Theorem

- The real roots of a polynomial equation $P(x) = 0$ correspond to the *x*-intercepts of the graph of the polynomial function $P(x)$.
- The *x*-intercepts of the graph of a polynomial function correspond to the real roots of the related polynomial equation.
- If a polynomial equation is factorable, the roots are determined by factoring the polynomial, setting its factors equal to zero, and solving each factor.
- If a polynomial equation is not factorable, the roots can be determined from the graph using technology.

Practice 1: Solve Polynomial Equations by Factoring

Solve.

(a) $x^3 - x^2 - 2x = 0$.

(b) $3x^3 + x^2 - 12x - 4 = 0$.

(c) $-x^3 + 2x^2 + 4x - 8 = 0$

Practice 2: Use the Factor Theorem to Solve a Polynomial Equation

(a) Solve $2x^3 + 3x^2 - 11x - 6 = 0$

(b) What do the values of x in part (a) represent in terms of the related polynomial function?

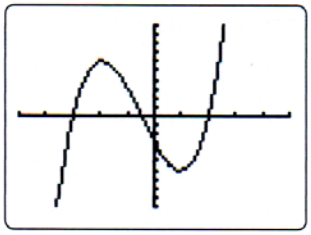
Practice 3: Solve a Polynomial Equation with Non-Real Roots

Note: A polynomial equation may have real and non-real roots.

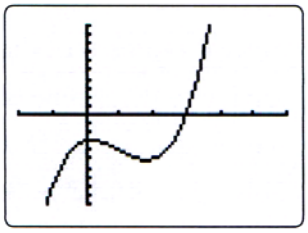
Solve $(x-3)(x^2+1)=0$.

*** The *x*-intercepts of the graph of a polynomial function correspond to the real roots of the related polynomial equation.**

$y=2x^3+3x^2-11x-6$



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



Practice 4: Determine the Roots of a Non-Factorable Polynomial Equation

(a) Solve $x^4+4x^3+5x^2=0$. Round the roots to one decimal place.

(b) Solve $x^3 - 3x = -1$. Round the roots to one decimal place.

Practice 5: Problem Solve by Determining the Roots of a Polynomial Equation

The volume, *V,* in cubic centimetres, of a block of ice that a sculptor uses to carve the wings of a dragon can be modelled by $V(x) = 9x^3 + 60x^2 + 249x$, where x represents the thickness of the block, in centimetres. What maximum thickness of wings can be carved from a block of ice with volume 2532 cm³?