

## Modeling a Problem Situation

**EX #4:** Find three consecutive integers whose product is 480 more than their sum?

# SOLVING POLYNOMIAL EQUATIONS

## VOCABULARY

**Sum of cubes** – an expression in the form of  $a^3 + b^3$  can be factored as

EX.  $x^3 + 8$

**Difference of cubes** – an expression in the form  $a^3 - b^3$  can be factored as

EX.  $x^3 - 27$

## Solving Polynomial Equation Essentials

Steps to solve a polynomial equation by factoring:

## Polynomial Factoring Techniques

TECHNIQUES	EXAMPLES
<b>Factoring Out the GCF</b> Factor out the greatest common factor of all the terms.	$18x^4 - 27x^2 + 45x^2$
<b>Quadratic Trinomials</b> For $ax^2 + bx + c$ , find factors with product $ac$ and sum $b$ .	$6x^2 - 5x - 4$
<b>Perfect Square Trinomials</b>	$x^2 + 16x + 64$  $x^2 - 16x + 64$
<b>Difference of Squares</b>	$4x^2 - 3$
<b>Factor By Grouping</b>	$x^3 - 4x^2 - 9x + 36$
<b>Sum/Difference of Cubes</b>	$64x^3 + 1$  $64x^3 - 1$

## Finding Real Roots By Graphing

EX #3: Solve  $x^3 + x^2 = x - 1$

### METHOD 1: INTERSECT Feature

1. Graph  $Y_1 = x^3 + x^2$  and  $Y_2 = x - 1$
2. Use the INTERSECT feature to find the  $x$ -values of the points of intersection.

### METHOD 2: ZERO Feature

1. Rewrite the equation
2. Graph the related function.
3. Use the ZERO feature.

## Solving Polynomials By Factoring

**EX #1:** What are the real or imaginary solutions of each equation?

A.  $(x^2 - 1)(x^2 + 4) = 0$

B.  $x^5 + 4x^3 = 5x^4 - 2x^3$

CCSS: HSA.APR.B.2; HSA.APR.B.3; HSF.IF.C.7.C;  
HSA.SSE.A.2



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## Solving Polynomial Equations

**EX #2:** Find the real or imaginary solutions for each polynomial equation.

A.  $x^4 = 16$

B.  $x^3 = 8x - 2x^2$

C.  $x(x^2 + 8) = 8(x + 1)$

## More Problem Solving

**EX #5:** The Perez twins were born two years after their older sister. This year, the product of the three sibling's ages is exactly 4558 more than the sum of their ages. How old are the twins?