

Factoring Difference of Squares

Degree must be 2 (quadratic)

Number of terms must be 2 (binomial)

Must be able to take $\sqrt{\text{ of A}}$ & $\sqrt{\text{ of C}}$

$$ax^2 \ominus c$$

subtraction

Steps for factoring success

1. Take $\sqrt{\text{ of A}}$ (Goes as 1st term in both parenthesis)
2. Take $\sqrt{\text{ of C}}$ (Goes as last term in both parenthesis)
3. Make one addition and one subtraction

$$\begin{array}{l} \text{GCF} \swarrow \\ 81x^2 - 36 \\ 9(9x^2 - 4) \\ 9(\underline{3x + 2})(\underline{3x - 2}) \end{array}$$

GCF

2 terms ✓

Degree 2 ✓

Difference ✓

$\sqrt{\text{ of A}}$ ✓

FACTORING PERFECT SQUARE TRINOMIALS

Must be a degree of 2 (Quadratic)

Must have 3 terms (Trinomial)

A & B are perfect squares

$$\boxed{A^2} + 2AB + \boxed{B^2} \rightarrow (A+B)^2$$

$$A^2 - 2AB + B^2 \rightarrow (A-B)^2$$

STEPS FOR FACTORING SUCCESS

1. Take the square root of A
2. Take the square root of B
3. Decide on the sign

EXAMPLE 1:

$$25x^2 + 100x + 100$$

$$A = 25x^2$$

$$B = 100$$

$$\sqrt{A} = \sqrt{25x^2}$$

$$\sqrt{B} = \sqrt{100}$$

$$A = 5x$$

$$B = 10$$

$$5 \cdot (5x+10)(5x+10) \rightarrow 5$$

$$- (5x+10)^2 -$$

$$25(x+2)^2$$

* take out 25 first

EXAMPLE 2:

$$16x^2 - 72x + 81$$

$$4x$$

$$9$$

$$(4x-9)^2$$

$$25(x^2+4x+4)$$

$$25(x+2)(x+2)$$

$$25(x+2)^2$$

Factoring Sum or Difference of Cubes

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Same
Opposite
Always Positive

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

S
D
A

* GCF First *

Steps for Factoring Success	
1.	Take cube root of a
2.	Take cube root of b
3.	SOAP

$$64x^3 + 1$$

$$\sqrt[3]{64x^3} = 4x \quad \sqrt[3]{1} = 1$$

$$(a+b)(a^2 - ab + b^2)$$

$$(4x + 1) \left((4x)^2 - (4x)(1) + (1)^2 \right)$$

$\frac{a}{a}$
 $\frac{b}{a}$
 $\frac{b}{b}$

$$(4x + 1)(16x^2 - 4x + 1)$$

$$125w^3 - 27$$