

8-5a Factoring Special Cases

PERFECT SQUARE TRINOMIALS

Degree of 2 (quadratic).

Number of terms is 3 (trinomial).

* A and B must be perfect squares.

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

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

STEPS TO FACTOR

1. Take the square root of a.

2. Take the square root of b.

3. Decide on the signs and build your binomials.

4. ~~FOIL~~ Expand & check by FOILing

Examples:

1. $25x^2 + 100x + 100$

$$a \rightarrow \sqrt{25x^2} \rightarrow 5x$$

$$b \rightarrow \sqrt{100} \rightarrow 10$$

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

$$(5x+10)(5x+10)$$

$$25x + 50x + 50x + 100$$

$$25x + 100x + 100 \checkmark$$

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

$$a \rightarrow \sqrt{16x^2} \rightarrow 4x$$

$$b \rightarrow \sqrt{81} \rightarrow 9$$

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

$$(4x-9)(4x-9)$$

$$16x^2 - 36x - 36x + 81$$

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

8-5b Factoring Special Cases

DIFFERENCE OF SQUARES

The degree is 2 (quadratic).

The number of terms is 3. (trinomial).

* A and C must be perfect squares.

$$ax^2 - c = \sqrt{ax^2} \sqrt{c} = \sqrt{ax^2 + c} \sqrt{ax^2 - c}$$

$(a+b)(a-b)$

STEPS TO FACTOR

1. Take the square root of a.
2. Take the square root of c.
3. Build your sum & difference binomials.
4. Check by FOILing

Examples:

1. $81x^2 - 36$

$a \rightarrow \sqrt{81x^2} \rightarrow 9x$

$c \rightarrow \sqrt{36} \rightarrow 6$

$(9x+6)(9x-6)$

$81x^2 - 54x + 54x - 36$

$81x^2 - 36 \checkmark$

2. $9n^2 - 400$

$a \rightarrow \sqrt{9n^2} \rightarrow 3n$

$c \rightarrow \sqrt{400} \rightarrow 20$

$(3n+20)(3n-20)$

$9n^2 - 60n + 60n - 400$

$9n^2 - 400 \checkmark$