

Factor Completely

Factor Out The GCF

Answers will look like **distributive** problems

$$10x^3 - 25x^2 + 15x$$

$$= 5x(2x^2 - 5x + 3)$$

$$27x^3 - 9x^2$$

$$= 9x^2(3x - 1)$$

$$4x^2y - 18y$$

$$= 2y(2x^2 - 9)$$

Second Degree Trinomials

$$Ax^2 \pm Bx + C$$

with $A > 1$

Second Degree Trinomials

$$Ax^2 \pm Bx + C$$

with $A = 1$

Second Degree
Binomials
Perfect Squares

Trinomials with
POSITIVE LAST term

$$Ax^2 \pm Bx + C \text{ with } A > 1$$

$$= (\text{first } x_1 \pm \text{last}_1) (\text{first } x_2 \pm \text{last}_2)$$

the 2 FIRST terms MULTIPLY to Ax^2
the 2 LAST terms MULTIPLY to C
and the outer and inner products
ADD to Bx

$$2 \cdot 3 \quad (2) \cdot 5$$

$$(6) \cdot 1 \quad 10 \cdot 1$$

$$6x^2 - 17x + 10$$

the 2 FIRST terms multiply to 12
the 2 LAST terms multiply to 10

$$= (6x - 5)(1x - 2)$$

the outer product is $-12x$
the inner product is $-5x$

Trinomials with a
POSITIVE LAST term

$$1x^2 \pm Bx + C$$

$$= (x \pm \text{last}_1) (x \pm \text{last}_2)$$

the 2 last terms MULTIPLY to C
the 2 last terms ADD to B

$$7 \cdot 2$$

$$14 \cdot 1$$

$$x^2 - 15x + 14$$

the 2 last terms multiply to 14
the 2 last terms add to -15

$$= (x - 14)(x - 1)$$

The Difference of Two
Perfect Squares

$$a^2 - b^2$$

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

$$4x^2 - 49$$

$$= (2x + 7)(2x - 7)$$

$$36x^2 - 25y^2$$

$$= (6x + 5y)(6x - 5y)$$

Trinomials with a
NEGATIVE LAST term

$$1x^2 \pm Bx - C$$

$$= (x \pm \text{last}_1) (x \pm \text{last}_2)$$

the 2 last terms MULTIPLY to C
the 2 last terms SUBTRACT to B

$$2 \cdot 5$$

$$1 \cdot 10$$

$$x^2 - 3x - 10$$

the 2 last terms multiply to 10
the 2 last terms subtract to -3

$$= (x + 2)(x - 5)$$

The Sum of Two
Perfect Squares
Does Not Factor

$$x^2 + 4$$

does not factor

$$4x^2 + 25$$

Prime

$$16x^2 + 1$$

DNF

Trinomials with $A > 1$
and a NEGATIVE LAST term
are factored like the ones above
but the outer and inner products
SUBTRACT to Bx