

Factoring

GCF:

$5x^2 - 10x$

$$5x(x-2)$$

$12x^5y^3 - 14x^9yz$

$$2x^5y(6y^2 - 7x^4z)$$

$3x^2y^4 + 18x^5y^3 + 7x^4y^6$

$$x^2y^3(3y + 18x^3 + 7x^2y^3)$$

Difference of Two Squares:

only works if subtracting & both terms are perfect squares.

$x^2 - 16$

$$(x+4)(x-4)$$

$9 - 25y^2$

$$(3-5y)(3+5y)$$

$x^8 - 1$

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

Trinomials: X Games

$x^2 - 8x - 20$

$$\begin{array}{r} (x) \\ -20 \\ \times \\ -10 \\ -8 \\ (+) \end{array} \quad (x-10)(x+2)$$

$x^2 + 15x + 36$

$$\begin{array}{r} 36 \\ \times \\ 3 \\ 12 \\ 15 \end{array} \quad (x+3)(x+12)$$

$x^2 - 8x + 16$

$$\begin{array}{r} 16 \\ \times \\ -4 \\ -4 \\ -8 \end{array} \quad (x-4)(x-4)$$

Grouping:

$8x^3 - 64x^2 + x - 8$

$$\begin{aligned} &(8x^3 - 64x^2) + (x - 8) \\ &8x^2(x - 8) + 1(x - 8) \\ &\cancel{8x^2(x - 8)} + (8x^2 + 1)(x - 8) \end{aligned} \quad (8x^2 + 1)(x - 8)$$

$4x^3 - 12x^2 - 5x + 15$

$$\begin{aligned} &(4x^3 - 12x^2) + (-5x + 15) \\ &4x^2(x - 3) - 5(x - 3) \\ &(4x^2 - 5)(x - 3) \end{aligned} \quad (4x^2 - 5)(x - 3)$$

$12x^3 + 2x^2 - 30x - 5$

$$\begin{aligned} &(12x^3 + 2x^2) + (-30x - 5) \\ &2x^2(6x + 1) - 5(6x + 1) \\ &(2x^2 - 5)(6x + 1) \end{aligned} \quad (2x^2 - 5)(6x + 1)$$

Trinomials (when a ≠ 1):

$3x^2 - 8x + 4$

$$\begin{array}{r} 12 \\ \times \\ 6 \\ -2 \\ -8 \end{array} \quad (3x-2)(x-2)$$

$ac = 3(4) = 12$   
 $-6 \cdot -2 = 12$   
 $-6 + -2 = -8$   
 $3x^2 - 6x \mid -2x + 4$   
 $3x(x-2) - 2(x-2)$

$4x^2 - 15x - 25$

$$\begin{array}{r} -100 \\ \times \\ -20 \\ -5 \\ -15 \end{array} \quad \begin{aligned} &4 \cdot -25 = -100 \\ &-20 \cdot +5 = -100 \checkmark \\ &-20 + 5 = -15 \end{aligned}$$

$$4x^2 - 20x + 5x - 25$$

$$4x(x-5) + 5(x-5)$$

$$(4x+5)(x-5)$$

$6x^2 + 7x - 49$

X