

Factoring flow chart

Put into standard form

$$3x - 5x^2 \rightarrow -5x^2 + 3x$$

Factor out a GCF (Especially negatives)

$$-6x^2 + 15x \rightarrow -3x(2x - 5)$$

Binomials (2 Terms)

Sum of Cubes

$$27x^3 + 1$$

$$(3x)^3 + (1)^3$$

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

Difference of Cubes

$$x^3 - 125$$

$$(x)^3 - (5)^3$$

$$(x-5)(x^2+5x+25)$$

Difference of Squares

(Sum of Squares do not factor)

$$9x^2 - 64$$

$$(3x)^2 - (8)^2$$

$$(3x-8)(3x+8)$$

Perfect Square Trinomials (Shortcut)

$$9x^2 - 30x + 25$$

$$(3x)^2 \quad (5)^2$$

$$2 \cdot 3x \cdot 5 = 30x \checkmark$$

$$(3x-5)^2 \text{ or } (3x-5)(3x-5)$$

Trinomials (3 Terms)

Lead Coefficient of 1

$$x^2 - 2x - 15$$

$$-5 \times 3$$

$$-2 \times 1$$

$$(x-5)(x+3)$$

Lead Coefficient other than 1

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

$$6 \times -5$$

$$-1 \times 1$$

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

Quadrinomials (4 Terms)

Grouping

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

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

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

Completely factor the following polynomials

1) $10x - 25x^2 - 1 = -25x^2 + 10x - 1$

$$-1(25x^2 - 10x + 1)$$

$$(5x)^2 \quad 2 \cdot 5x \cdot 1 = 10x \quad (1)^2$$

$$-1(5x-1)^2$$

2) $75 - 12x^2 = -12x^2 + 75$

$$-3(4x^2 - 25)$$

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

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

3) $36x - 16 + 10x^2 = 10x^2 + 36x - 16$

$$2(5x^2 + 18x - 8)$$

$$2(5x^2 + 20x - 2x - 8)$$

$$2(x+4)(5x-2)$$

$$2[5x(x+4) - 2(x+4)]$$