

FACTORING TRINOMIALS & POLYNOMIALS

PART 1: Factor by Grouping

1.) $(16x^3 + 6x^2) + 8x + 3$

$2x^2(8x+3) + 1(8x+3)$

$(8x+3)(2x^2+1)$

2.) $(2x^3 + 8x^2) - 3x - 12$

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

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

3.) $(24x^3 - 56x^2) - 9x + 21$

$8x^2(3x-7) - 3(3x-7)$

$(3x-7)(8x^2-3)$

4.) $(x^3 + 3x^2) - 25x - 75$

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

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

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

5.) $(12x^3 - 8x^2) - 3x + 2$

$4x^2(3x-2) - 1(3x-2)$

$(3x-2)(4x^2-1)$

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

6.) $(8x^5 + 12x^3) - 6x^2 - 9$

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

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

PART 2: Factoring a Trinomial – Leading Coefficient is 1

7.) $x^2 + 5x + 6$

$(x+3)(x+2)$

8.) $x^2 - 2x - 15$

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

9.) $x^2 - 6x + 8$

$(x-4)(x-2)$

10.) $x^2 - 14x + 48$

$(x-8)(x-6)$

11.) $x^2 - 16x + 63$

$(x-9)(x-7)$

12.) $x^2 - 9x - 36$

$(x-12)(x+3)$

PART 3: Factoring a Trinomial – Leading Coefficient is not 1

13.) $2x^2 - 7x + 3$

$$(2x^2 - 6x)(-x + 3)$$

$$2x(x-3) - 1(x-3)$$

$$(x-3)(2x-1)$$

$$\frac{ac}{b}$$

$$6 \mid -7$$

$$-6 \cdot -1 = 6 \checkmark$$

$$-6 + (-1) = -7 \checkmark$$

14.) $2x^2 - 3x - 20$

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

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

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

$$\frac{ac}{b}$$

$$-40 \mid -3$$

$$-8 \cdot 5 = -40 \checkmark$$

$$-8 + 5 = -3 \checkmark$$

15.) $3x^2 - 11x - 20$

$$(3x^2 - 15x)(4x - 20)$$

$$3x(x-5) + 4(x-5)$$

$$(x-5)(3x+4)$$

$$\frac{ac}{b}$$

$$-60 \mid -11$$

$$-15 \cdot 4 = -60 \checkmark$$

$$-15 + 4 = -11 \checkmark$$

16.) $4x^2 - 8x + 3$

$$(4x^2 - 6x)(-2x + 3)$$

$$2x(2x-3) - 1(2x-3)$$

$$(2x-3)(2x-1)$$

$$\frac{ac}{b}$$

$$12 \mid -8$$

$$-6 \cdot -2 = 12 \checkmark$$

$$-6 + (-2) = -8 \checkmark$$

17.) $6x^2 - 7x - 5$

$$(6x^2 - 10x)(3x - 5)$$

$$2x(3x-5) + 1(3x-5)$$

$$(3x-5)(2x+1)$$

$$\frac{ac}{b}$$

$$-30 \mid -7$$

$$-10 \cdot 3 = -30 \checkmark$$

$$-10 + 3 = -7 \checkmark$$

18.) $10x^2 + 27x + 5$

$$(10x^2 + 25x)(2x + 5)$$

$$5x(2x+5) + 1(2x+5)$$

$$(2x+5)(5x+1)$$

$$\frac{ac}{b}$$

$$50 \mid 27$$

$$25 \cdot 2 = 50 \checkmark$$

$$25 + 2 = 27 \checkmark$$

PART 4: Mixed Practice – Factor each expression completely.

19.) $x^2 - 5x - 14$

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

20.) $(28x^3 + 24x^2)(-35x - 30)$

$$4x^2(7x+6) - 5(7x+6)$$

$$(7x+6)(4x^2-5)$$

21.) $5x^2 + 3x - 2$

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

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

$$(5x+2)(x+1)$$

$$\frac{ac}{b}$$

$$-10 \mid 3$$

$$-2 \cdot 5 = -10 \checkmark$$

$$-2 + 5 = 3 \checkmark$$

22.) $9x^2 + 21x + 10$

$$(9x^2 + 6x)(5x + 10)$$

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

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

$$\frac{ac}{b}$$

$$90 \mid 21$$

$$6 \cdot 15 = 90 \checkmark$$

$$6 + 15 = 21 \checkmark$$

23.) $(12x^3 - 4x^2)(-27x + 9)$

$$4x^2(3x-1) - 9(3x-1)$$

$$(3x-1)(4x^2-9)$$

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

24.) $15x^2 - 14x + 3$

$$(15x^2 - 9x)(5x + 3)$$

$$3x(5x-3) - 1(5x-3)$$

$$(5x-3)(3x-1)$$

$$\frac{ac}{b}$$

$$45 \mid -14$$

$$-9 \cdot -5 = 45 \checkmark$$

$$-9 + (-5) = -14 \checkmark$$