

Warm-Up

$$1) \quad -4 |-5x - 6| \geq -44$$

$$2) \quad (2x^0)^{-3}(y^4)^4$$

$$3) \quad (x^{-2}y^2)^3y^4$$

Objective: Today we will apply various methods in order to factor polynomials completely.

Agenda:

- Group Review
- Independent Assignment
- Packet/Questions

Trinomials with $a=1$

"Short A•C"

$$\begin{array}{ccc} a & b & c \\ |x^2 - 19x + 90 & & \\ 90 & & \\ \hline -10 & -9 & -19 \end{array}$$

The diagram shows the factorization of the trinomial $x^2 - 19x + 90$. The first row has a , b , and c above the terms x^2 , $-19x$, and 90 respectively. The second row has 90 below the constant term. The third row is a horizontal line. Below the line, two numbers -10 and -9 are circled and connected by a red bracket above the line, indicating they are the factors of the constant term. To the right of the line, the factored form $(x-10)(x-9)$ is enclosed in a red rounded rectangle.

$$x^2 - 4x - 32$$

$$\begin{array}{c} -32 \\ \swarrow \quad \searrow \\ -8 \quad 4 \\ | \qquad \qquad \qquad -4 \\ \end{array}$$

$(x-8)(x+4)$
 $(x+4)(x-8)$

Trinomials with $a \neq 1$ "Long A•C"

$$4a^2 - \underline{7a} - 36$$

$$\begin{array}{r} -144 \\ \swarrow \quad \searrow \\ -16 \quad 9 \\ \hline | -7 \end{array}$$

$$\begin{aligned} & (4a^2 - 16a) + (9a - 3) \\ & 4a(a - 4) \pm 9(a - 4) \\ & (a - 4)(4a + 9) \end{aligned}$$

$$6a^2 - 17a + 12$$

$$\begin{array}{r} A \cdot C \\ 72 \\ \hline -8 \quad -9 \end{array}$$

$$(6a^2 - 8a)(9a + 12)$$

$$2a(3a-4) - 3(3a-4)$$

$$(2a-3)(3a-4)$$

Difference of Squares

$$a^2 - b^2 \Rightarrow (a + b)(a - b)$$

$$\sqrt{x^2} - \sqrt{25}$$

$$\sqrt{9k^2} - \sqrt{16}$$

$$(x+5)(x-5) \quad (3k-4)(3k+4)$$

Sum and Difference of Cubes

$$a^3 + b^3 \Rightarrow (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 \Rightarrow (a - b)(a^2 + ab + b^2)$$

To find $\sqrt[3]{}$ on calculator:

Math → #4

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$\sqrt[3]{x^3 + 216} \Rightarrow (x+6)(x^2 - 6x + 36)$$

$$x \quad 6$$

$$(3m+4)(9m^2 - 12m + 16)$$

$$\sqrt[3]{27m^3 + 64}$$

$$\frac{a}{3m} \quad \frac{b}{4}$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$8x^3 - 125$$

$$(2x-5)(4x^2+10x+25)$$

Other Types

$$\frac{(20x^3 - 8x^2)(+ 5x - 2)}{4x^2(5x - 2) + 1(5x - 2)}$$
$$(4x^2 + 1)(5x - 2)$$

$$|x^4 + 2x^2 - 8$$

$$\begin{array}{r} -8 \\ \diagup \quad \diagdown \\ 4 \quad -2 \end{array} \Big| 2$$

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

$$\begin{array}{r}
 10a^4 + 13\cancel{a^2} + 4 \\
 (10a^4 + 8a^2)(5a^2 + 4) \\
 2a^2(5a^2 + 4) + 1(5a^2 + 4) \\
 (2a^2 + 1)(5a^2 + 4)
 \end{array}$$

Common Factor

$$2n^3 + 20n^2$$
$$2n^2(n + 10)$$

$$2n^3 - 128n$$

$$2n(n^2 - 64)$$

$$2n(n-8)(n+8)$$

$$9p^2 + 4$$

Prime

