

Factoring - GCFs and Binomials

Focus:

Factor...

$48x^3y - 27xy$ ← Do this at the end!

1) $(x-b)^2$

2) $8ab(3a^2b^3 - 2ab^2)$

Use distributive prop. and FOIL to check!

$3xy(16x^2 - 9)$

GCF

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

GCF: "GREATEST COMMON FACTOR"

- Always check for GCF 1st! (2+ terms!)
- Largest quantity that divides evenly from all terms of an expression

→ Greatest # ex: 18, 27 → 9

→ smallest exp. for ea. variable (subt. exp.)

ex: $x^4y^7, x^3y^9 \rightarrow x^3y^7$

ex: $2x - 2 = 2(x - 1)$

GCF

→ Don't forget the "1".

ex: $4x^2y^4z^6 - 24x^3y^2z^4$

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

GCF

ex: $25a^3b^2c + 5a^4bc^2 - 5a^3$

$5a^3(5b^2c + abc^2 - 1)$

ex: $25x^{1/2}y^3 - 50x^{5/2}y^4$ ← Do this one last!

$25x^{1/2}y^3(1 - 2x^2y)$

GCF

→ Don't forget the "1".

ex: $-a^3b^5c^2 - 3abc$

$-abc(a^2b^4c + 3)$

* always want LC in parenthesis to be +.

Binomials: 2 TERMS ONLY

1) Perfect Squares - $a^2 \pm b^2$

Diff of Squares

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

— order doesn't matter!

ex: $16x^2 - 9 = (4x+3)(4x-3)$

ex: $4a^2 - 25b^2$

ex: $121y^2 - 81x^4 = (11y+9x^2)(11y-9x^2)$

ex: $75a^2 - 27b^2$

$3(25a^2 - 9b^2)$

$3(5a+3b)(5a-3b)$

ex: $16x^3y - 4xy$

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

$4xy(2x+1)(2x-1)$

Sum of Squares

$a^2 + b^2$? PRIME

ex: $16x^2 + 81$

PRIME!

~~$(4x+9)(4x+9)$~~ ?

$16x^2 + 36x + 36x + 81$

72x?

2) Perfect Cubes - $a^3 \pm b^3$

sum or difference of cubes

$a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$ → $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

binomial

trinomial — can't be factored!

GCF?
Diff of 50?
Cubes?

ex: $125x^3 - 64$

$5x \quad 4$

$(5x-4)(25x^2 + 20x + 16)$

ex: $8y^6 + 27x^3$

$2y^2 \quad 3x$

$(2y^2 + 3x)(4y^4 - 6xy^2 + 9x^2)$

ex: $16a^3b^6 - 54x^3y^3$

$2(8a^3b^6 - 27x^3y^3)$

$2ab^2 \quad 3xy$

$2(2ab^2 - 3xy)(4a^2b^4 + bab^2xy$

$+ 9x^2y^2)$

* ex: $(x+3)^3 + 64$

$(x+3+4)(x+3)^2 - 4(x+3) + 16)$

$(x+7)(x^2 + 6x + 9 - 4x - 12 + 16)$

$(x+7)(x^2 + 2x + 13)$