Greatest common factor & grouping

Date _____ Topic 1/4

CUES · QUESTIONS

1. First step in ANY factoring question?
2. GCF of $12a^3b^2$ and $18a^2b^5$?
3. Four terms, no GCF. Try…
4. $(5 - x)$ written with x first?

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

2 · Fill in the blanks Cover the steps and redo it. Leave a gap where you are unsure.

3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

CUES · QUESTIONS

1. Decomposition: which two numbers?
2. $c > 0$, $b < 0$: signs of the two numbers?
3. Factor $x^2 + 9x + 20$.
4. Leading coefficient negative — first move?

Cover the notes. Answer each cue from memory.

NOTES

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

Difference of squares & perfect squares

Date _____ Topic 3/4

CUES · QUESTIONS

1. $A^2 - B^2$ = ?
2. Test for a perfect square trinomial?
3. Factor $4x^2 - 1$.
4. Does $x^2 + 16$ factor?

Cover the notes. Answer each cue from memory.

NOTES

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

Factoring by substitution

Date _____ Topic 4/4

CUES · QUESTIONS

1. Substitution for $x^4 + 3x^2 - 10$?
2. Spot quadratic form how?
3. Last step after factoring in m?
4. $(x+5)^2 - 16$ = ?

Cover the notes. Answer each cue from memory.

NOTES

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🧩 Polynomial Factoring • Formula and trap sheet

Everything you need before a test, on the fewest pages. Fold it and keep it in your binder.

Greatest common factor & grouping

FORMULAS

$ab + ac = a(b + c)$ — Common factor (distributive law backwards)

$ax + ay + bx + by = a(x + y) + b(x + y) = (x + y)(a + b)$ — Factoring by grouping

REMEMBER

- GCF first: largest number dividing every coefficient × each variable to its LOWEST power.
- A bracket can be the common factor: $2x(x - 3) + 5(x - 3) = (x - 3)(2x + 5)$.

WATCH OUT

- A term equal to the GCF leaves 1: $3x^2y + 6x^3y = 3x^2y(1 + 2x)$, not $3x^2y(2x)$.
- $-9x - 18 = -9(x - 2)$ × → $-9(x + 2)$.

Factoring trinomials ax²+bx+c

FORMULAS

$x^2 + (m + n)x + mn = (x + m)(x + n)$ — Trinomial with $a = 1$

$ax^2 + bx + c: \ \ mn = ac, \ \ m + n = b \ \Rightarrow \ ax^2 + mx + nx + c$ — Decomposition: split the middle term

REMEMBER

- $a = 1$: two numbers that multiply to c and add to b.
- $a \neq 1$: two numbers that multiply to ac and add to b; split the middle, then group.

WATCH OUT

- $6x^2 + 7x - 3$: product -3 × → product $ac = -18$.
- $2x^2 + 10x + 12 = (2x + 4)(x + 3)$ is not fully factored → $2(x + 2)(x + 3)$.

Difference of squares & perfect squares

FORMULAS

$A^2 - B^2 = (A - B)(A + B)$ — Difference of squares

$A^2 \pm 2AB + B^2 = (A \pm B)^2$ — Perfect square trinomials

REMEMBER

- $A^2 - B^2 = (A - B)(A + B)$: two squares with a MINUS.
- $A^2 \pm 2AB + B^2 = (A \pm B)^2$: check the middle is exactly $2AB$.

WATCH OUT

- $x^2 + 9 = (x + 3)^2$ × → a sum of squares does not factor.
- $x^2 + 10x + 16 = (x + 4)^2$ × → middle would be $8x$; it is $(x + 2)(x + 8)$.

Factoring by substitution

FORMULAS

$a\,[f(x)]^2 + b\,f(x) + c \xrightarrow{m = f(x)} am^2 + bm + c$ — Substitution for quadratic form

REMEMBER

- Spot $a(\text{stuff})^2 + b(\text{stuff}) + c$; let $m =$ the stuff.
- Factor in m, substitute back, simplify each bracket.

WATCH OUT

- Leaving the answer in m × → substitute back to x.
- $(2x - 1) - (x + 3) = x + 2$ × → $x - 4$: the minus hits the whole bracket.