Look Again

Factoring completely — because *correct* and *finished* are not the same thing.

THE ROUTINE — IN THIS ORDER, EVERY TIME

1. **Common factor? Take it out first .**
2. **Two terms? Try difference of two squares.**
3. **Three terms? Two numbers: product and sum.**
4. **LOOK AGAIN — can any bracket go further?**
5. **Check — expand it back.**

ALL THREE ARE CORRECT. ONE IS FINISHED.

$$2x^2 - 8$$

$2(x^2 - 4)$	$(2x - 4)(x + 2)$	$2(x - 2)(x + 2)$
NOT FINISHED	NOT FINISHED	COMPLETE

Every one expands back to $2x^2 - 8$. The first leaves $x^2 - 4$ factorable; the second leaves a 2 inside $2x - 4$. **Nothing here is wrong — two of them are unfinished.**

THE THREE TYPES YOU MUST KNOW

TYPE	PATTERN	EXAMPLE
Common monomial factor	$ab + ac = a(b + c)$	$6x^2 + 15x = 3x(2x + 5)$
Difference of two squares	$a^2 - b^2 = (a - b)(a + b)$	$x^2 - 64 = (x - 8)(x + 8)$
Quadratic trinomial	product and sum	$x^2 + 9x + 14 = (x + 2)(x + 7)$
Perfect square trinomial	$a^2 + 2ab + b^2 = (a + b)^2$	$x^2 - 12x + 36 = (x - 6)^2$

A perfect square trinomial is **not a fourth method** — it is a trinomial whose two factors happen to be the same. Spotting it saves time; missing it costs none.

THE TWO-STEPPERS — WHERE MARKS ARE LOST

$2x^2 - 72$	$2(x^2 - 36)$	$2(x - 6)(x + 6)$	CMF THEN DOTS
$3x^3 - 3x$	$3x(x^2 - 1)$	$3x(x - 1)(x + 1)$	CMF THEN DOTS
$2x^2 + 14x + 20$	$2(x^2 + 7x + 10)$	$2(x + 2)(x + 5)$	CMF THEN TRINOMIAL

The **amber** middle column is correct. It is also where most answers stop.

THESE DO NOT FACTOR — AND STOPPING IS THE RIGHT ANSWER

$$x^2 + 4 \quad x^2 + 25 \quad x^2 + 2x + 3 \quad x^2 + 5x + 9$$

A sum of two squares never factors. Nor does every trinomial: for $x^2 + 2x + 3$ you would need two numbers multiplying to 3 and adding to 2, and there are none.
"It stops here" is a complete answer.

Common factor first. Then look again.