What are the steps we follow to factor?

FACTORING FLOW MAP

When do we factor?
"factor"
"Solve"
"zeros", "roots",
"x-intercepts"

Quadratic? (x^2)
X-method (ac, b)
T-chart (ac, b)

If X-method doesn't work, use QUADRATIC FORMULA

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

Cubic? x^3
or higher $x^4, x^5 \ldots$

Check for a GCF
↓
divide by GCF and write in front

Example:

$$\frac{2x^2}{2x} - \frac{4x}{2x}$$

$$= 2x(x-2)$$

If you get quadratic, go back to start

Check for a special case

- Difference of squares:
  $a^2 - b^2 = (a-b)(a+b)$
- Difference of cubes:
  $a^3 - b^3 = (a-b)(a^2+ab+b^2)$
- Sum of cubes
  $a^3 + b^3 = (a+b)(a^2-ab+b^2)$
- Quartic Trinomial
  $ax^4 + bx^2 + c = a(x^2)^2 + b(x^2) + c$
  Factor like quadratic

Find a factor (given to you, or find x-intercept on calculator)
↓
Divide by that factor. *CHECK FOR MISSING TERMS*
↓
Write answer as divisor • quotient

If quadratic, go back to start

Once fully factored, set each factor equal to zero and solve for x

$(x-2)(x+3)$
Zeros: 2, -3

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

$x^2+6=0$
$-6 \quad -6$
$\sqrt{x^2} = \sqrt{-6}$
$x = \pm i\sqrt{6}$

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