SKILL #19

CODE: PST.1

# Perfect square trinomials

## Core Concept

A perfect square trinomial is a quadratic expression formed by squaring a binomial. It follows one of these patterns:

1. Positive: $a^2 + 2ab + b^2 = (a + b)^2$
2. Negative: $a^2 - 2ab + b^2 = (a - b)^2$

Think of it as "the square of a sum or difference creates a perfect square trinomial.

## When to use it?

- When the trinomial fits $a^2 \pm 2ab + b^2$.
- This type of factoring helps simplify expressions and solve quadratic equations

## GULDEN RULE

Make sure the middle term is exactly $2ab$ or $-2ab$. If it's not, then it's just a regular trinomial (like $ax^2 + bx + c$) and you'll need to factor it using other methods.

## Examples

Example 1: Factor $4x^2 - 12x + 9$

STEP 1: Check if it's a trinomial: Yes, it has three terms. ✅

STEP 2: Check if the first and last terms are perfect squares:

$4x^2 = (2x)^2$ and $9 = 3^2$ ✅

STEP 3: Check the middle term: Is it $2ab$: $2(2x)(3) = 12x$ ✅

STEP 4: Use the sign of the middle term --> $-12x$ so $(a - b)^2$

STEP 5: Write Factored Form: $(2x - 3)^2$ ✅

Example 2: Factor $x^2 + 14x + 49$

STEP 1: Check if it's a trinomial: Yes, it has three terms. ✅

STEP 2: Check if the first and last terms are perfect squares:

$x^2$ and $49 = 7^2$ ✅

STEP 3: Check the middle term: Is it $2ab$: $2(x)(7) = 14x$ ✅

STEP 4: Use the sign of the middle term --> $14x$ so $(a + b)^2$

STEP 5: Write Factored Form: $(x + 7)^2$ ✅

## Common Mistakes to Avoid

- ❌ Not checking if the middle term is correct $2ab$
- ❌ Wrong sign in the binomial (check the middle term sign.
- ❌ Forgetting to check perfect squares: $x^2 + 6x + 8$ is not a perfect square trinomial

MORE EXAMPLES

## Additional Resources

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