LESSON MAKER PRO

Identity Power

Use special products to simplify quickly.

HIGH SCHOOL · HSA-APR.C

CCSS.Math.Content.HSA-APR.C "Use polynomial identities to solve problems"

NAME _____ DATE _____

SPOT THE PATTERN

Use $(a + b)^2 = a^2 + 2ab + b^2$ and $(a - b)^2 = a^2 - 2ab + b^2$ for squared binomials. Use $(a + b)(a - b) = a^2 - b^2$ when the middle terms are opposites. These identities can make expansion, factoring, and mental computation faster.

WORKED EXAMPLE

Expand $(x + 14)^2$.

1. $(x + 14)^2 = (x + 14)(x + 14)$.
2. Multiply: $x^2 + 14x + 14x + 196$.
3. Combine like terms: $x^2 + 28x + 196$.

Answer: $x^2 + 28x + 196$

PRACTICE 6 problems

1 Expand $(x - 3)^2$.

ANSWER _____

2 Expand $(2x + 5)^2$.

ANSWER _____

3 Find the product $(x + 7)(x - 7)$.

ANSWER _____

4 Find the product $(3x + 4)(3x - 4)$.

ANSWER _____

5 Factor $x^2 + 10x + 25$ using a perfect-square identity.

ANSWER _____

6 Use an identity to find 63 times 57.

ANSWER _____

APPLY IT Show your work

1 A robotics club makes a square practice mat with side length $(x + 8)$ feet. Write an expression for the area of the mat in square feet.

WORK SPACE

ANSWER _____

2 A video creator has a rectangular backdrop with length $(x + 13)$ inches and width $(x - 13)$ inches. Write an expression for its area in square inches.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without multiplying every pair of terms, simplify $(4x + 15)^2 - (4x - 15)^2$. Explain your reasoning.

WORK SPACE AND ANSWER

Identity Power

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Expand $(x - 3)^2$.	**$x^2 - 6x + 9$**
2	Expand $(2x + 5)^2$.	**$4x^2 + 20x + 25$**
3	Find the product $(x + 7)(x - 7)$.	**$x^2 - 49$**
4	Find the product $(3x + 4)(3x - 4)$.	**$9x^2 - 16$**
5	Factor $x^2 + 10x + 25$ using a perfect-square identity.	**$(x + 5)^2$**
6	Use an identity to find 63 times 57.	**3591**

PART 2 · APPLY IT

1. **$x^2 + 16x + 64$ square feet** Square the side length: $(x + 8)^2 = x^2 + 16x + 64$.
2. **$x^2 - 169$ square inches** The dimensions are conjugates, so $(x + 13)(x - 13) = x^2 - 169$.

CHALLENGE

240x.

Accept equivalent expressions with terms in a different order. For expanded forms, coefficients and signs must be correct; for the factoring item, accept only the equivalent perfect-square binomial.