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

CHALLENGE

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

_____

_____

ANSWER KEY

Identity Power

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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. Let A = 4x and B = 15. Since (A + B)^2 - (A - B)^2 = 4AB, the expression is 4(4x)(15) = 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.