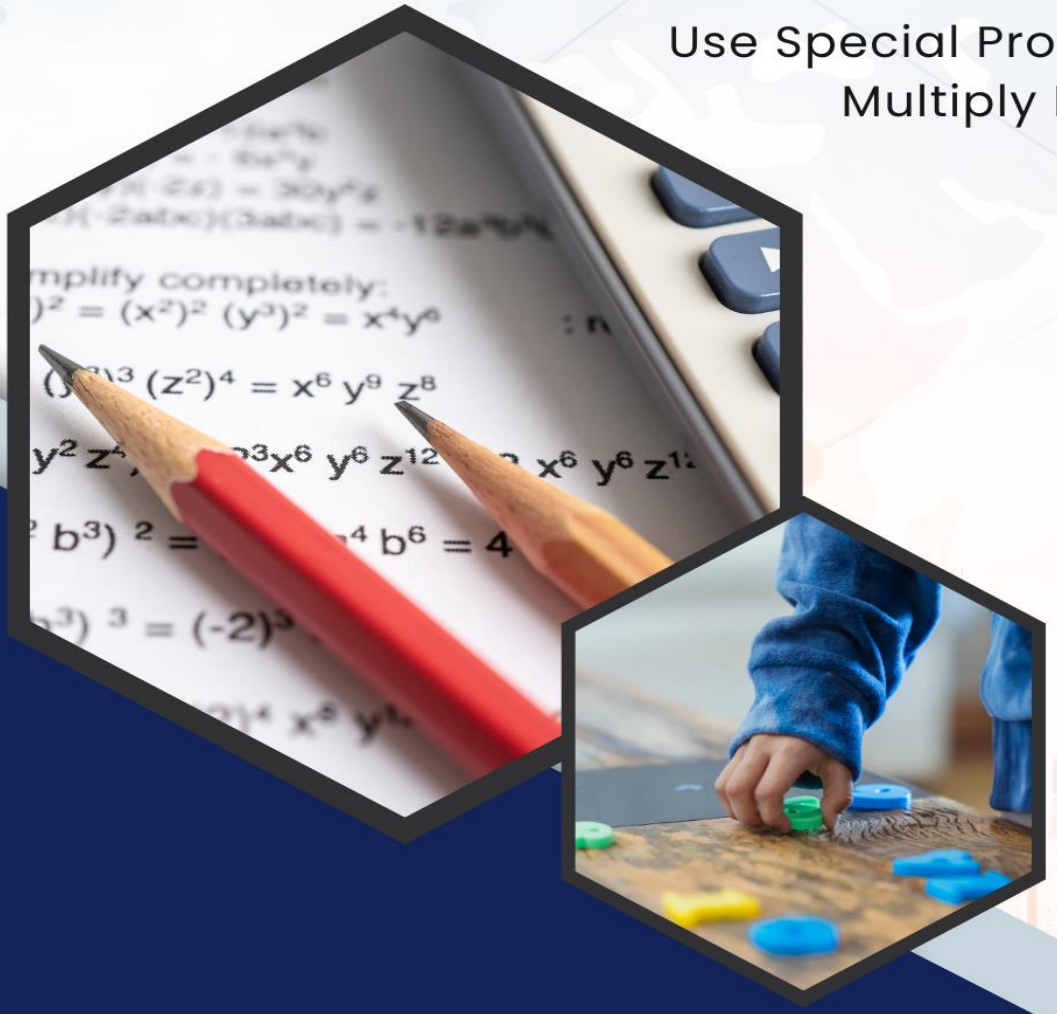
ALMS8

TAILORED LEARNING, PERSONALIZED PROGRESS

GRADE 8

SUPPLEMENTARY MODULE 7

Use Special Product Patterns To Multiply Binomials



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2 USE SPECIAL PRODUCT PATTERNS TO MULTIPLY BINOMIALS

WELCOME, LEARNERS!

Hello, fantastic eighth graders! We know that mastering special product patterns can be a bit challenging, but remember, every math superhero has faced a tough problem or two. In this supplementary session, we've got your back. If you're still catching up from the main course or feeling a bit uncertain, don't worry – you're not alone. We're here to support you every step of the way. Let's celebrate the progress you've made and work together to boost your confidence. Remember, it's okay to take your time. You've got this, and we believe in your ability to conquer the world of

Learning Objectives:

At the end of this module, students will be able to:

1. analyze various types of binomial multiplication problems, identify the appropriate special product patterns, and apply them accurately to solve complex mathematical expressions;
2. exhibit increased proficiency in executing the steps involved in multiplying binomials using special product patterns; and
3. develop a heightened confidence in approaching challenging mathematical problems involving special product patterns.

Three Special Cases of Multiplying Binomials and their Patterns

Let a be the first term in the expression and b be the second term.

1. Square of a Sum (Add times Add)

$$(a+b)^2 = a^2 + 2ab + b^2$$

Example:

$$(2r+12)^2 = ?$$

Let a = 2r (first term) and b = 12 (second term). Substitute into $a^2 + 2ab + b^2$.

$$= (2r)^2 + 2(2r)(12) + (12)^2$$
$$= 2^2r^2 + 2(2r)(12) + 12^2$$
$$(2x+10)^2 = 4r^2 + 48r + 144$$

2. Square of a Difference (Subtract Times Subtract)

$$(a-b)^2 = a^2 - 2ab + b^2$$

Example:

$$\left(3y^3 - \frac{1}{9}\right)^2 = ?$$

Let a = $3y^3$ (first term) and b = 1/9 (second term). Substitute into $a^2 - 2ab + b^2$.

$$= (3y^3)^2 - 2(3y^3)\left(\frac{1}{9}\right) + \left(\frac{1}{9}\right)^2$$
$$= 3^2y^{3\times2} - 2(3y^3)\left(\frac{1}{9}\right) + \left(\frac{1}{9}\right)^2$$
$$\left(3y^3 - \frac{1}{9}\right)^2 = 9y^6 - \frac{6}{9}y^3 + \frac{1}{81} = 9y^6 - \frac{2}{3}y^3 + \frac{1}{81}$$

3. Product of the Sum and Difference (Add Times Subtract)

$$(a+b)(a-b) = a^2 - b^2$$

Example:

$$\left(rs - \frac{2}{7}\right)\left(rs + \frac{2}{7}\right) = ?$$

Let a = rs (first term) and b = 2/7 (second term). Substitute into $a^2 - b^2$.

$$= (rs)^2 - \left(\frac{2}{7}\right)^2$$

$$= r^2s^2 - \left(\frac{2}{7}\right)^2$$

$$\left(rs - \frac{2}{7}\right)\left(rs + \frac{2}{7}\right)$$

$$= r^2s^2 - \frac{4}{49}$$