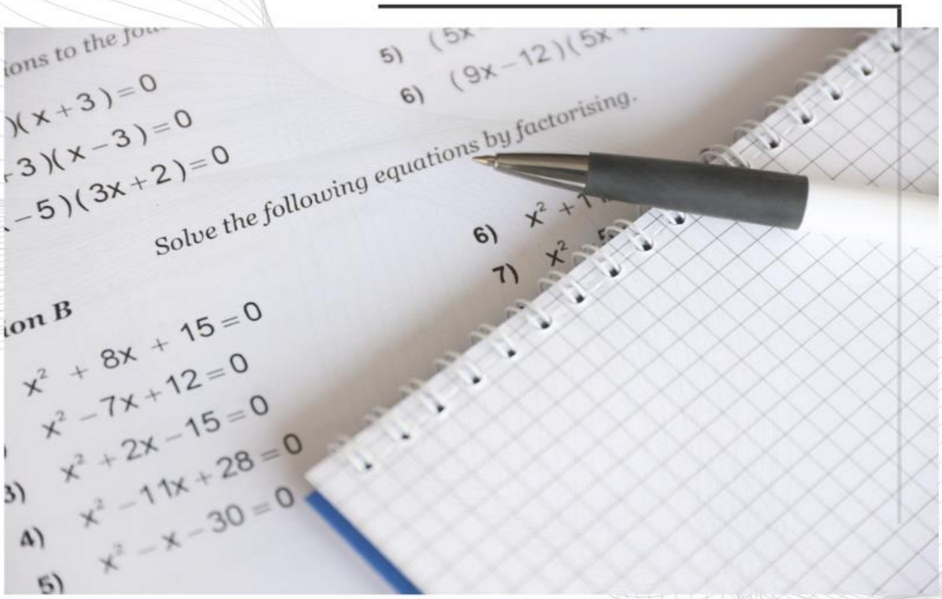
MALMS8

TAILORED LEARNING, PERSONALIZED PROGRESS

SUPPLEMENTARY MODULE 6

Multiplying Simple Monomials and Binomials with Simple Binomials with Simple Binomials and Multinomials, Using the Distributive Property with Various Techniques and Models



GRADE-8

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MULTIPLYING SIMPLE MONOMIALS AND BINOMIALS WITH SIMPLE BINOMIALS AND MULTINOMIALS, USING THE DISTRIBUTIVE PROPERTY WITH VARIOUS TECHNIQUES AND MODELS

WELCOME, GRADE-8 LEARNERS!

If you're finding yourself needing a bit of extra support with our recent lessons on multiplying monomials and binomials, you're in the right place! We understand that grasping these concepts might take some time, and that's completely okay. In this supplementary session, we're here to offer a helping hand, guiding you gently through the material until you feel confident in your abilities. Remember, everyone learns at their own pace!

LEARNING OBJECTIVES

1. Analyze algebraic expressions involving simple monomials, binomials, and multinomials;

2. Apply various techniques or models for multiplying monomials and binomials with simple binomials and multinomials

3. Demonstrate accuracy in using different techniques or models in multiplying simple monomials and binomials with simple binomials and multinomials.

Multiplying Monomials

- **Multiplying Monomial by a Binomial**

  Example: Multiply $(6x)(2x + 5y)$.

  Solution:

  Step 1: Multiply the monomial with the first term of the binomial.

$$= (6x)(2x) = 12x^2$$

Step 2: Multiply the monomial with the second term of the binomial.

$$= (6x)(5y) = 30xy$$

Step 3: Write both the terms obtained in Step 1 and Step 2 together with their corresponding signs.

$$= 12x^2 + 30xy$$

$$\boldsymbol{Answer: 12x^2 + 30xy}$$

- **Multiplying Monomial by a Trinomial (Multinomial)**

  Example: Multiply $(a^2)(a + 2b - 3c)$.

  Solution:

  Step 1: Multiply the monomial with the first term of the trinomial.

$$= (a^2)(a) = a^3$$

  Step 2: Multiply the monomial with the second term of the trinomial.

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

  Step 3: Multiply the monomial with the third term of the trinomial.

$$= (a^2)(-3c) = -3a^2c$$

  Step 4: Write all three terms together with their corresponding signs.

$$= a^3 + 2a^2b - 3a^2c$$

$$\boldsymbol{Answer: a^3 + 2a^2b - 3a^2c}$$

Multiplying Binomials

- **Multiplying Binomial using Distributive Property**

  Example: Multiply $(5y + 3z)$ and $(7y - 15z)$.

  Step 1: To multiply $(5y + 3z)(7y - 15z)$, we will take the first term of the first binomial and multiply it with the second binomial,

$$5y(7y - 15z)$$

  Step 2: Now, we will take the second term of the first binomial and multiply it with the second binomial,

$$3z(7y - 15z)$$

  Step 3: We will combine the results of Step 1 and Step 2 and add them,

$$[5y(7y - 15z)] + [3z(7y - 15z)]$$

  Step 4: Now we will apply the distributive property and individually expand them,

$$5y(7y - 15z) = 35y^2 - 75yz$$

and

$$3z(7y - 15z) = 21yz - 45z^2$$

  Step 5: We will now add the results obtained in Step 4 by combining the like terms,

$$35y^2 - 75yz + 21yz - 45z^2$$

$$\mathbf{= 35y^2 - 45z^2 - 54yz}$$

- **Multiplying Binomials Using the FOIL Method**

  Note that FOIL is an acronym that stands for FIRST – OUTER – INNER – LAST.

  Example: Find the product of $(8y - 5)(y + 10)$.

  Step 1: FIRST - Multiply the first terms of each binomial together.

$$(8y)(y)$$

$$= 8y^2$$

  Step 2: OUTER - Multiply the outer terms of each binomial together.

$$(8y)(10)$$

$$= 80y$$

Step 3: INNER - Multiply the inner terms of each binomial together.

$$(-5)(y)$$
$$= -5y$$

Step 4: LAST - Multiply the last terms of each binomial together.

$$(-5)(10)$$
$$= -50$$

Now you have four terms: $8y^2, 80y, -5y, and\ -50$.

Step 5: Notice that there are two like terms that can be combined as follows:

$$8y^2 + \mathbf{80y} - \mathbf{5y} - 50$$
$$= 8y^2 + 75y - 50$$

Step 6: The final step is to rearrange the above expression into $ax^2 + bx + c$ form.

Answer: $\mathbf{8y^2 + 75y - 50}$

- **Multiplying Binomials Using the Vertical Method**

Example: Solve $(5x - 1)(2x - 7)$.

Step 1: Place the binomials one below the other.

$$\begin{array}{r} 5x - 1 \\ \underline{\times \qquad 2x - 7} \\ -35x + 7 \\ \underline{+\ 10x^2 - 2x \qquad} \\ \mathbf{10x^2 - 37x + 7} \end{array}$$

Step 2: Start with the second or the right-hand term of the bottom binomial, -7, and multiply this value with both the terms of the top binomial individually that

$$(-7 \times 5x) + (-7 \times -1)$$
$$= -35x + 7$$

Step 3: Now let's consider the first or the left-hand term of the bottom binomial, 2x, and multiply this value with both the terms of the top binomial individually that is

$$(2x \times 5x) + (2x \times -1)$$

$$= 10x^2 - 2x$$

Step 4: Write the result obtained in the previous step in the second row in such a way that the like terms are lined up.

Step 5: Finally, add the columns to obtain the result which is

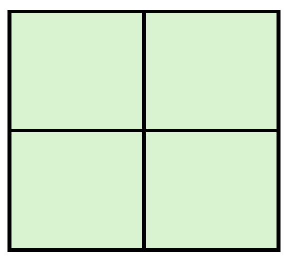
$$\mathbf{10x^2 - 37x + 7}$$

- **Multiplying Binomials Using the Box Method Area Model:**

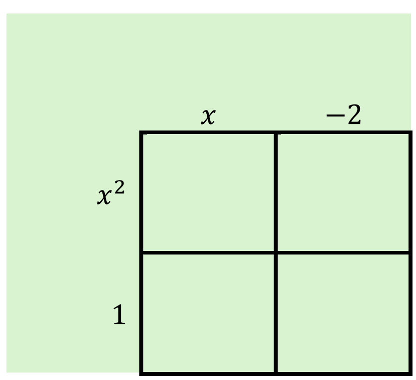
  The box method for multiplying binomials is also known as the area model method.

  Example: Write the $(x-2)(x^2+1)$ in expanded form.

  Step 1: To use the area model method or box method for multiplying binomials, start by drawing a 4 x 4 box.



  Step 2: Then, write the terms of the first binomial [$(x-2)$ in this example] along the top row and the terms of the second binomial [(x^2+1) in this example] along the left column of the box as follows:



Step 3: Next, multiply the terms of each corresponding column and row (like a bingo board) as follows:

	x	-2
x^2	$(x)(x^2)$ $= \boldsymbol{x^3}$	$(-2)(x^2)$ $= \boldsymbol{-2x^2}$
1	$(x)(1)$ $= \boldsymbol{x}$	$(-2)(1)$ $= \boldsymbol{-2}$

Now you have four terms: $x^3, -2x^2, x, and - 2$.

Step 4: Notice that there are no like terms. Therefore, you can now write your final answer in expanded form as follows:

Answer: $\boldsymbol{x^3 - 2x^2 + x - 2}$