MALMS8

TAILORED LEARNING, PERSONALIZED PROGRESS

LEARNING MODULE 3

Model Real-Life Situations Using Algebraic Expressions

GRADE 8

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1 MODEL REAL-LIFE SITUATIONS USING ALGEBRAIC EXPRESSIONS

Hey there, amazing learners! Welcome to our exciting journey into the world of algebraic expressions. In this course, we're going to explore how to model real-life situations using the power of algebra. Get ready to embark on an adventure where we'll uncover the secrets of turning everyday scenarios into mathematical expressions. So, buckle up and let's dive into the magic of algebra together!

LEARNING OBJECTIVES

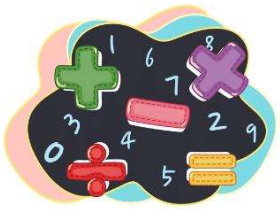
- Recall the fundamental algebraic expressions used in modelling real-life situations using algebraic expressions
- Explain the steps of modelling real-life situations using algebraic expressions.
- Cite examples of how algebraic expressions can be used to model real-life situations.

Algebraic expressions are used to represent real-life situations where the value of one or more variables is unknown or can be any numerical value. They are a combination of variables, constants, and mathematical operations, such as addition, subtraction, multiplication, and division.

Here are some fundamental algebraic expressions commonly used in modeling real-life situations:

Algebraic Expressions	General Form
Linear expressions- these are used in situations where there is a constant rate of change.	y=mx +b where: m is the slope, and b is the y-intercept.
Quadratic expressions- these are used in situations where there is a variable rate of change.	$y = ax^2 + bx + c$ where: a, b, and c are constants
Rational expressions- these are used in situations involving ratios or rates.	$y = \frac{p(x)}{q(x)}$ where: p(x) and q(x) are polynomial functions

Modeling real-life situations using algebraic expressions involves translating real-world problems into mathematical equations or formulas. This allows us to represent and analyze relationships between variables and make predictions about the outcome of various scenarios.



Here's a step-by-step guide to modeling real-life situations using algebraic expressions:

1. **Identify the problem or situation you want to model.**

   What are the key elements or variables involved?

2. **Define the variables.** Assign symbols to represent the unknown or changing quantities in the problem.

For example:

Let x represent the quantity of item A

Let y represent the price of item B

Let z represent the distance traveled.

3. **Identify the relationships between the variables.** How are the variables related to each other? Express these relationships using mathematical equations or formulas.

For instance, the total cost (T) of purchasing multiple items can be expressed as: T = x * y + z * w

4. **Simplify the expressions.** Combine like terms and use appropriate algebraic manipulations to simplify the expressions.

Like terms are terms in algebraic expression that have the same variable raised to the same power.

Examples: 3x and 5x, $2y^2$ and $-7y^2$

5. **Use the expressions to solve problems or make predictions.** Substitute numerical values for the variables and evaluate the expressions to find specific solutions.

For example, if the price of item A is $2, the price of item B is $3, and you buy 3 items of A and 2 items of B, the total cost would be:

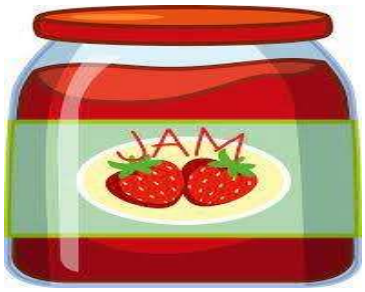
T = 3 * 2 + 2 * 3 = 9

6. **Interpret the results.** What do the solutions or predictions mean in the context of the real-world problem?

Here are some examples of how algebraic expressions can be used to model real-life situations:

Calculating the total cost of items:

Suppose you want to calculate the total cost of purchasing multiple items at different prices. Let x represent the quantity of item A, y represent the quantity of item B, and z represent the quantity of item C. The total cost (T) can be expressed using the following algebraic expression:

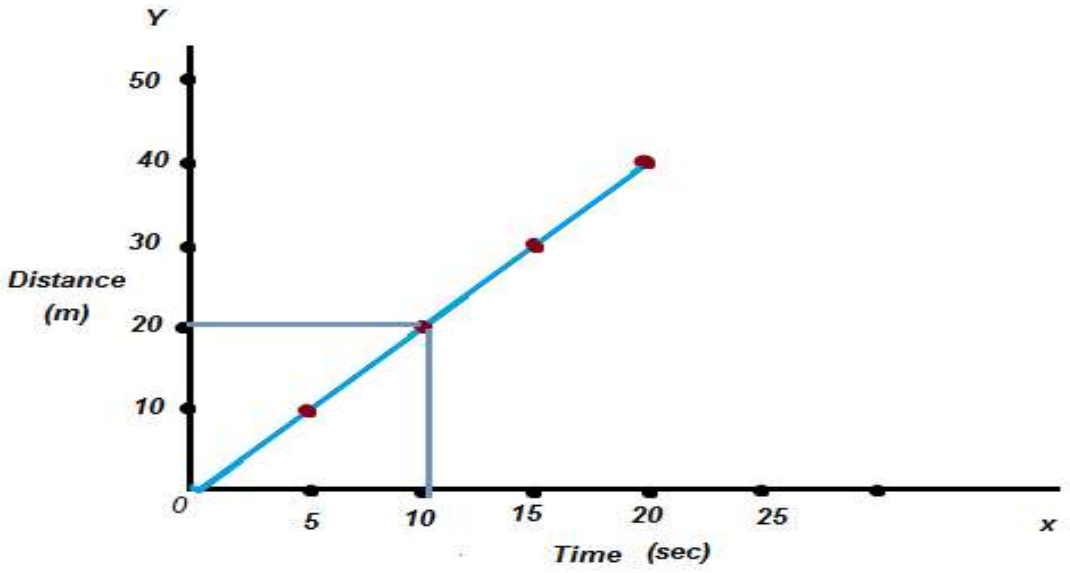
		
X = Number of Chocolate	**Y = Number of bread**	**Z = Number of Jam**

2x + 3y + 5z

In this example, the coefficients 2, 3, and 5 represent the prices of items A, B, and C, respectively.

Determining the distance traveled:

Imagine you're driving at a constant speed (s) for a time duration (t). The total distance (d) traveled can be re presented using the following algebraic expression:



$$D = S * T$$

In this example, the variables s and t represent the speed and time, respectively.

Calculating the perimeter and area of shapes:

In geometry, algebraic expressions can be used to find the perimeter and area of various shapes. For instance, the perimeter (P) of a rectangle with length (l) and width (w) can be expressed as: **P = 2l + 2w**