



# MATHEMATICS

## GRADE 9

DATE: .....

### 1. TOPIC: ALGEBRAIC EQUATIONS - 1

#### 2. CONCEPTS & SKILLS TO BE ACHIEVED:

- By the end of the lesson learners should know and be able to;
  - set up equations to describe problem situation
  - analyse and interpret equations that describe a given situation

#### 3. RESOURCES:

DBE Workbook 1, Sasol-Inzalo book 1, Textbooks

#### 4. INTRODUCTION

Divide learners into small groups. Give them 4 expressions and 4 equations like the ones below:

$$3x + 15$$

$$x - 1 = 9$$

$$3p - 9 = p$$

$$x^2 + 4$$

$$4y$$

$$m = 3$$

$$x^2 = 10$$

$$an - d$$

Group the expressions together and the equations together. Identify how the equations differ from the expressions.

**Note:** When learners can identify an equation then they are ready to move on and setting up equations to describe situations. Guide learners in setting up an equation that has 5 as a solution.

Start by writing the solution

$$x = 5$$

Add 3 to both sides

$$x + 3 = 8$$

Multiply both sides by 3

$$3x + 9 = 24$$

What is the equation?

**Note:** Encourage the learners to use their own words to read an equation formed, for example, 3 multiplied by 'what' and add 9 should give me 24.

#### 4. LESSON PRESENTATION/DEVELOPMENT

Teaching activities	Learning activities (Learners are expected to:)
<p><b>Activity 1</b></p>  <p>Andile worked to get the equation <math>3(x + 4) = 21</math> but he rubbed out part of his work as follows:</p> <p>Start by writing the solution <math>x = \underline{\hspace{2cm}}</math></p> <p><math>\underline{\hspace{2cm}}</math> <math>x + 4 = \underline{\hspace{2cm}}</math></p> <p>Multiply both sides by 3 <math>3(x + 4) = \underline{\hspace{2cm}}</math></p> <p>Complete Andile's writing to solve the equation.</p> <p>After having completed the example and activity 1, ask the learners if it is possible to move from the equation to the solution because previously they have been moving from the solution to the equation referring to their own equations obtained in activity 1 above. The response should be YES. Ask them how that can be done. Give them few minutes to think about it and eventually present the following examples on the board.</p> <p>To make an equation you can do the same operation on both sides</p> <p>To solve an equation you can do the inverse operation on both sides</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Multiply with 8</p> <p>add 3</p> <p>subtract <math>5x</math></p> <p>↓</p> </div> <div style="text-align: center;"> <p><math>x = 4</math></p> <p><math>8x = 32</math></p> <p><math>8x + 3 = 35</math></p> <p><math>3x + 3 = 35 - 5x</math></p> </div> <div style="text-align: center;"> <p>↑</p> <p>Divide by 8</p> <p>subtract 3</p> <p>add <math>5x</math></p> </div> </div>	 <ul style="list-style-type: none"> <li>• Complete Andile's work, working in pairs</li> <li>• discuss in pairs how to move from the equation to the solution and present their findings to the whole class</li> </ul>

## Activity 2

Translate each of the following situations into mathematical equation. Do not solve the equation. Use the letter  $x$  for the unknown number:

- a) If we multiply a number by 2 and then add 5, the answer is 43.

$$2x + 5 = 43$$

- b) If we divide a number by 5 and then add 8, the answer is 30.

$$\frac{x}{5} + 8 = 30$$

**Note:** Give the learners different numbers per pair to use to form an equation. Move around as they are doing it and after few minutes allow them to present the equation while facilitating the process. After doing that, present number two below to them and let learners complete it.

- In pairs translate the situations given into equations

## 5. CLASSWORK



- 1) Create an equation that has your birth date as the solution. Use more than one operation.
- 2) Shaun is 7 years older than Mike. Let Shaun's age be  $x$ . Express each of the following in terms of  $x$ .
  - a) Mike's age
  - b) Shaun's age in 2 years time
  - c) Mike's age in 2 years time
- 3) In 2 years' time, Shaun will be twice as old as Mike. Set up an equation that expresses this situation.
- 4) For each of the following situations, choose the equation that describes the situation and write down the letter that corresponds to the correct option.
  - i. A number increased by 11 gives 20.
    - A  $11x = 20$
    - B  $x + 11 = 20$
    - C  $x - 11 = 20$
    - D none of the above
  - ii. If you subtract 8 from a number you get 14
    - A  $8 - x = 14$
    - B  $x = 14 - 8$

- C  $x - 8 = 14$
- D none of the above

iii. A certain number is doubled and added to 23. The answer is 31.

- A  $2x + 23 = 31$
- B  $2(x + 23) = 31$
- C  $x = 2(23 + 31)$
- D none of the above

## 6. CONSOLIDATION / CONCLUSION & HOMEWORK

### a) **Emphasise the following:**

Two or more equations can have the same solution. For example,  $5x = 10$  and  $x + 2 = 4$  have the same solution;  $x = 2$  is the solution for both equations.

Two equations are called **equivalent** if they have the same solution.

“Searching” for the solution of an equation by using tables or by narrowing down to the possible solution is called **solution by inspection**.

### **Recommended Homework:**

Translate each of the following into mathematical equations. Do not solve the equation. Use the letter  $x$  for the unknown number:



- a) If you subtract 9 from 8 multiplied by the number, you get 42.
- b) Sam is 7 years older than his younger brother is. The sum of their ages is 23. If Sam is  $x$  years old, set up an equation to express this situation.

