

MATHEMATICS

GRADE 9

DATE:

1. TOPIC: ALGEBRAIC EQUATIONS - 4

2. CONCEPTS & SKILLS TO BE ACHIEVED:

- By the end of the lesson learners should know and be able to
 - determine numerical value of an expression by substitution
 - analyse and interpret equations that describe a given situation

3. RESOURCES:

DBE Workbook 1, Sasol-Inzalo book 1, Textbooks,

4. INTRODUCTION

Write the following example on the board $x + 4 = 10$. If the value of $x = 8$, ask the learners if it is true or false, if not, what would make the statement correct?



The expected answer is 6.

Therefore, when we figure out the number that makes the mathematical sentence true, we say that we are solving the problem (equation). An **equation** is a mathematical sentence that is true for some values but false for other values e.g. 8 in the above example is false and 6 is true.

For more complex ones, one will have to do the actual substitution before arriving at the answer. Substitution ensures the correctness of the answer in equations.

Allow your learners to work in pairs.

Example 1

Say whether the following statements are true or false. Justify your answer:

- a) $x - 7 = 0$, if $x = 7$
- b) $x^3 = 8$, if $x = -2$
- c) $3x = 1$, if $x = 1$
- d) $6x + 5 = 65$, if $x = 10$

4. LESSON PRESENTATION/DEVELOPMENT

Teaching activities



Learning activities (Learners are expected to:)

Activity 1

1. Six equations are listed below the table. Use the table to find out for which of the given values of x it will be true that the left-hand side of the equation is equal to the right-hand side.

x	-3	-2	-1	0	1	2	3	4
$2x + 3$	-3	-1	1	3	5	7	9	11
$x + 4$	1	2	3	4	5	6	7	8
$9 - x$	12	11	10	9	8	7	6	5
$3x - 2$	-11	-8	-5	-2	1	4	7	10
$10x - 7$	-37	-27	-17	-7	3	13	23	33
$5x + 3$	-12	-7	-2	3	8	13	18	23
$10 - 3x$	19	16	13	10	7	4	1	-2

a) $2x + 3 = 5x + 3$

b) $5x + 3 = 9 - x$

c) $2x + 3 = x + 4$

d) $10x - 7 = 5x + 3$

e) $3x - 2 = x + 4$

f) $9 - x = 2x + 3$

- Explain that two 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.
2. Which of the equations in question 1 have the same solutions? Explain.

- use the table to find the value(s) of x that make the LHS = RHS for the given equations

- work in pairs



- Explain that two equations are called equivalent if they have the same solution.

Activity 2

Consider this situation:

To rent a room in a certain building, you have to pay a deposit of R400 and then R80 per day.

- a) Which of the following best describes the equation that you can use to answer question 1(b) and (c)?

- A. Total cost = R400 + R80
- B. Total cost = 400(number of days + 80)
- C. Total cost = 80 × number of days + 400
- D. Total cost = (80 + 400) × number of days

- b) How much money do you need to rent the room for 10 days?

- c) How much money do you need to rent the room for 15 days?

- d) For how many days can you rent the room described in question 1, if you have R2 800 to pay?

Note:

- If you want to know for how many days you can rent the room if you have R720, you can set up an equation and solve it: You know the total cost is R720 and you know that you can work out the total cost like this:

Total cost = $80x + 400$, where x is the number of days. So,
 $80x + 400 = 720$ and $x = 4$ days.

- use the table to find equations that have the same solutions
- work in pairs
- analyse the given situations and come up with the equations
- solve the equations

5. CLASSWORK & Homework

1. Complete the table below and answer the questions that follow.



x	0	5	10	15	20	25	30	35	40
$2x + 2$									
$3x - 3$									

- a) Can you find a solution for $2x + 2 = 3x - 3$ in the table?

- b) What happens to the values of $2x + 2$ and $3x - 3$ as x increases? Do they become bigger or smaller?
- c) Is there a point where the value of $3x - 3$ becomes bigger or smaller than the value of $2x + 2$ as the value of x increases?
- d) For which value(s) of x is the statement $2x + 2 = 3x - 3$ true?

Ben and Thabo decide to do some calculations with a certain number. Ben multiplies the number by 5 and adds 12. Thabo gets the same answer as Ben when he multiplies the number by 9 and subtracts 16. What is the number they worked with?

6. CONSOLIDATION / CONCLUSION

Emphasise the following:

- a) learners must know the exponent laws and be able to apply it,
- b) to solve an equation where the variable is in the exponent position, the basis must be made the same so that the exponents can be equated.

