



Mathematical Sciences: MMSC4

LESSON 3

UNIT STANDARD: 7448

Topic: Number Patterns

By the end of this lesson, you should be able to:

- Use variables in an expression.
- Write relationship pattern rules based on the term number.
- Recognise and work with patterns drawn on graph paper

LEARNER SUPPORT MATERIAL

- Exercise books
- Calculators
- Pencils

FACT FILE

- In a table, the input values are written in the top row, and are called x values. The output values are written in the second row, and are called y values.
- A **variable** is a letter or symbol that is used to show a quantity. This quantity can have different values. For example, t is a variable that could be used to represent the amount of time you surf the Internet each day.
- A general rule is a pattern rule that tells you how to get any term in the pattern without listing all the terms before it.
- Variables are usually used when writing general rules to make the rules easier to write.
- For example, a general rule for the pattern 50, 100, 150, 200, ... is $50 \times n$. The variable n is the term number.

Term (x)	Value $y = (50 \times x)$
1	$50 \times 1 = 50$
2	$50 \times 2 = 100$
3	$50 \times 3 = 150$
4	$50 \times 4 = 200$
5	$50 \times 5 = 250$

Therefore, the common difference(d) is 50

And the general formula is given by $y=50x$

Activity 1

1. Thapelo is baking cookies for a school bake sale. One batch of cookies uses 75 g of chocolate chips.
 - a) Calculate the number of grams of chocolate chips in the first four batches of cookies.



Batch number	Number of grams of chocolate chips
1	
2	
3	
4	

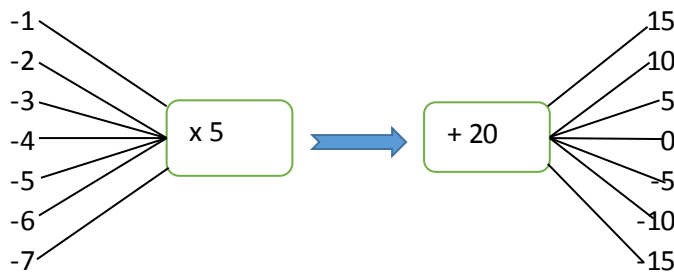
- Write the general formula using the variable for the batch number. Use the variable x .
- Calculate the number of grams of chocolate chips in the first four batches using your answer in part (b). Show your work.
- How many grams of chocolate chips does Thapelo need to make 11 batches of cookies?

Example

Flow diagram, shows what calculations are to be done to calculate the output number that corresponds to a given variable.

Input variable

output variable



- The general formula is $output\ variable = input\ variable \times (-5) + 20$
- The output numbers of a function are also called function values. Hence the formula can also be written as
 $Function\ value = 5x + 20$

Activity 2

- Write down all the different output different output numbers that will be obtained when the calculations $50 - 5x$ are performed on the different numbers in Set A

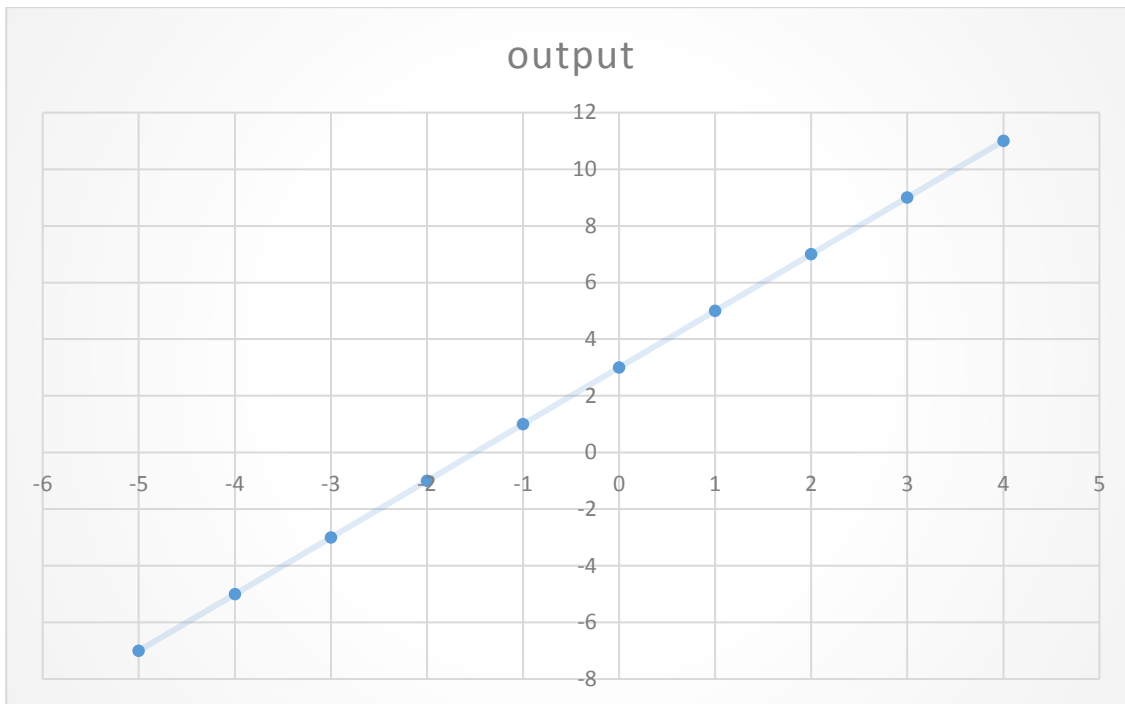
Input numbers	1	2	3	4	5	6	7
Values of $50 - 5x$							

- Write down all the different output different output numbers that will be obtained when the calculations $50 - 5x$ are performed on the different numbers in Set B.

Input numbers	20	30	40	50	60	70	80
Values of $50 - 5x$							



3. Given the set of even numbers 2;4;6;8; 10;
 - 3.1 What will all the output numbers be if the rule $2n + 1$ is applied to the set of even numbers? Draw the flow diagram to represent the results.
 - 3.2 What will the output numbers be if the rule $2n - 1$ is applied? Again draw the flow diagram to represent the results.
 - 3.3 Compare the two results in question 3.1 and 3.2
4. A graph of a certain function is given below.
 - 4.1 Complete the table below:



Input numbers x										
Function values y										

4.2 Describe the function and write the formula beginning with

$$y = \dots$$



ACTIVITY 3

1. Let n represent any term number.

Write a relation for the term for each number pattern.

a)

Term Number	1	2	3	4	5
Term	7	8	9	10	11

b)

Term Number	1	2	3	4	5
Term	7	14	21	28	35

c)

Term Number	1	2	3	4	5
Term	4	7	10	13	16

2. An equilateral triangle has three equal sides.

Write a relation for the perimeter of an equilateral triangle with side length k .

What is the perimeter of an equilateral triangle with side length 15 cm?

3. The cost of soccer jerseys for the soccer team is R50 for the initial set-up, plus R15 for each jersey ordered.

a) Write a relation for the total cost of j jerseys.

b) Another company charges R80 for the initial set-up, and R30 per jersey. Write a relation for the total cost of j jerseys for this company.

c) Which company would charge less if you ordered 12 jerseys?

4. Suggest a real-life situation that could be represented by each relation.

a) $n + 7$ is related to n

b) $4s + 5$ is related to s

c) $20 + 4d$ is related to d

5. There are n students in the concert band.

Write a relation for each statement.

a) the total number of music stands, if each pair of students shares one stand

b) the total number of chairs, if there are 4 more chairs than students

c) the total number of sheets of music, if each student has 7 sheets