

FUNCTIONS AND RELATIONSHIPS

NOTES & ACTIVITIES

GRADE 9

Name and surname: _____

1. VARIABLES AND CONSTANTS

TERMINOLOGY

A quantity that changes is called a **VARIABLE QUANTITY**, or just a **VARIABLE**.

A quantity that never changes is called a **CONSTANT QUANTITY**, or just a **CONSTANT**.

A rule that shows the relationship between the input values and output values so that for **EACH INPUT VALUE THERE IS ONLY ONE OUTPUT VALUE**.

CONNECTIONS BETWEEN QUANTITIES

EXAMPLE 1



Consider the following TWO situations. There are two quantities in each situation. For each quantity, state whether it is constant (always the same number) or whether it changes.

1. Your age and the number of fingers on your hands.
2. The number of learners at school and the amount of hours in a day.

EXERCISE 1

Consider the following FOUR situations. There are two quantities in each situation. For each quantity, state whether it is **constant** (always the same number) or whether it **changes**.

1. The number of calls you make and the airtime left on your cell phone.
2. The size of your eyes and your ability to finish Mathematics test quickly.
3. The number of learners at a school and the number of classrooms needed. The number of matches in each arrangement, and the number of triangles in the arrangement.



2. FLOW DIAGRAMS

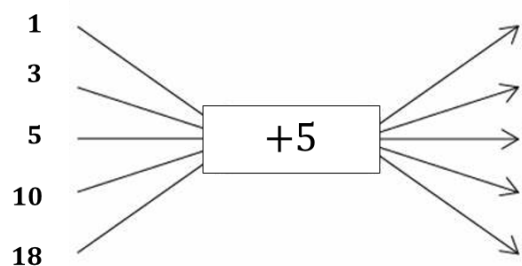
TERMINOLOGY

Each input number in a flow diagram has a corresponding output number. The first input number corresponds to the first output number. The second input number corresponds to the second output number and so on. We call $+5$ the operator.



EXAMPLE 1

Let's determine the output values:

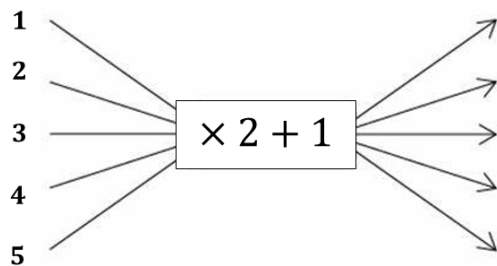


EXAMPLE 2



You are given input numbers, multiply it by 2 and add 1.

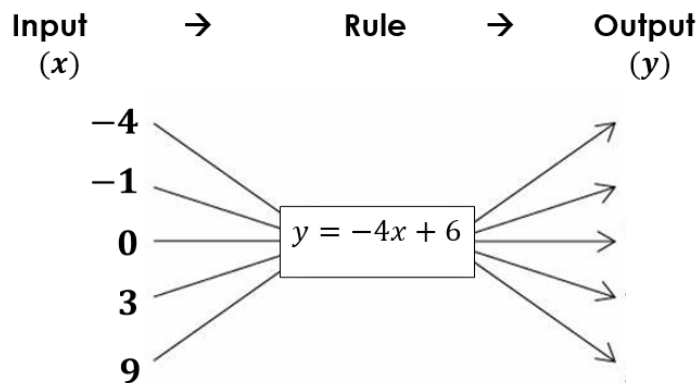
Let's determine the output values:





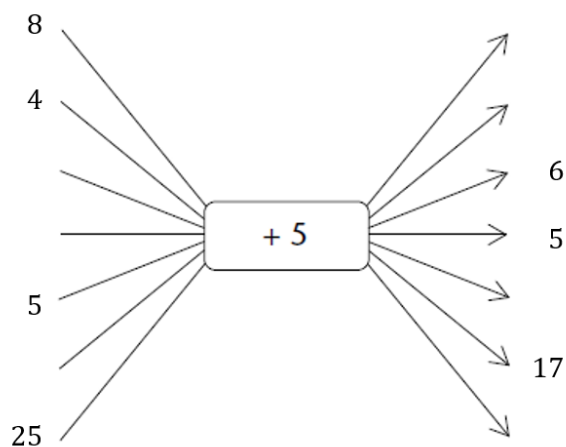
EXAMPLE 3

You are given input values which must go through the rule $y = -4x + 6$, determine the output values:



EXAMPLE 4

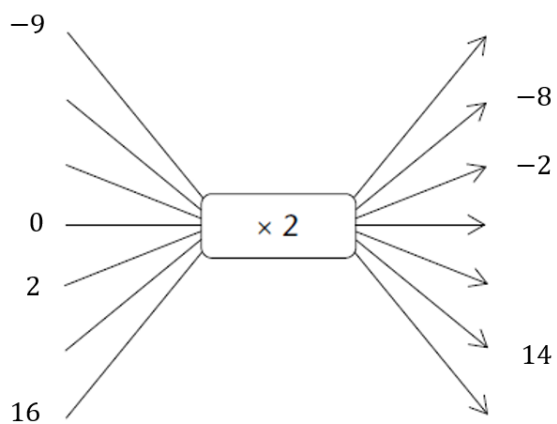
Complete the following flow diagrams:



EXAMPLE 5



Complete the following flow diagrams:



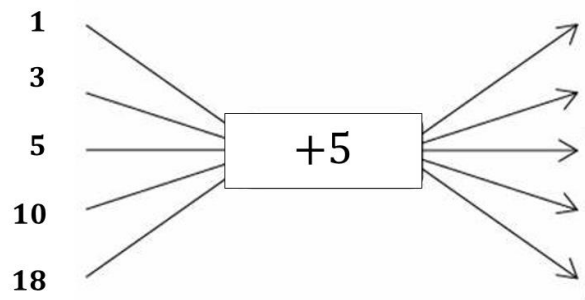
EXERCISE 2 Create your own flow diagrams

3. TABLES



EXAMPLE 1

We can also represent the information from a flow diagram in a table.

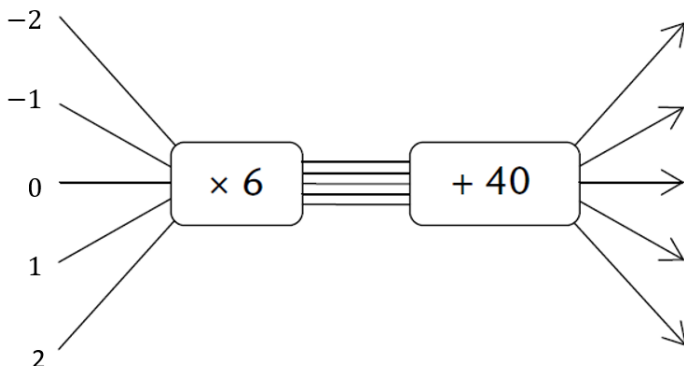


Input	1	3	5	10	18
Output					



EXAMPLE 2

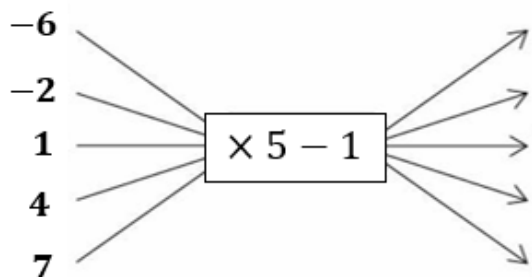
We can also represent the information from a flow diagram in a table.



Input	-2	-1	0	1	2
Output					

EXERCISE 3

3.1.1 Complete the flow diagram.



3.1.2 Represent your information from the flow diagram in 3.1.1 in a table.

Input	-6	-2	1	4	7
Output					

3.1.3 Describe in words how to calculate the output value for any input value.

GROUP ACTIVITY

- Use the flow diagram that you have previously created and display it in the table form. Ensure that you use input values (x) and output values (y)
- Clearly display the rule.
- Describe the relationship between the input value and the output value

Input value (x)						
Output value (y)						

FROM TABLES TO ORDERED PAIRS



$$y = 2x + 1$$

Input value (x)	-2	-1	0	1	2
Output value (y)					

Identify all the ordered pairs.

Cartesian Plane

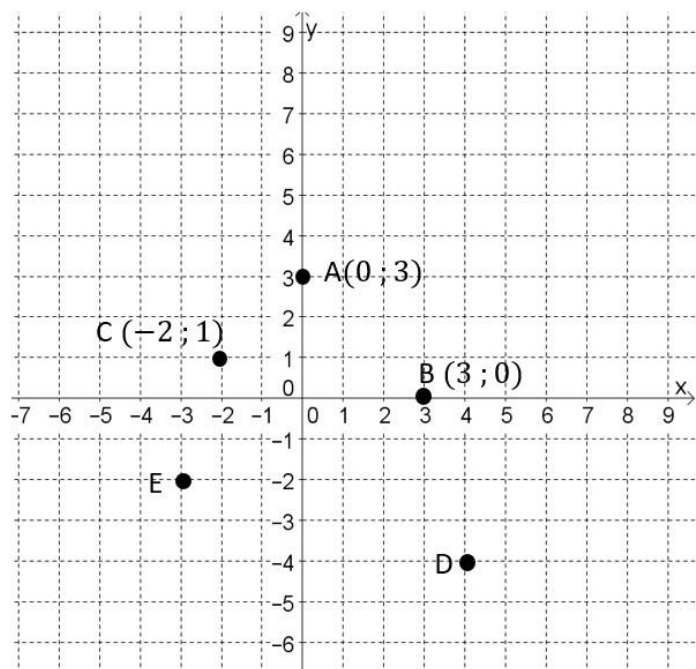
Discuss points A; B and C

- Does the point lie in a quadrant or on an axis?
- What is noticeable of the coordinates in relation to the quadrant or axis?

DETERMINE THE ORDERED PAIRS OF

D (;)

E (;)

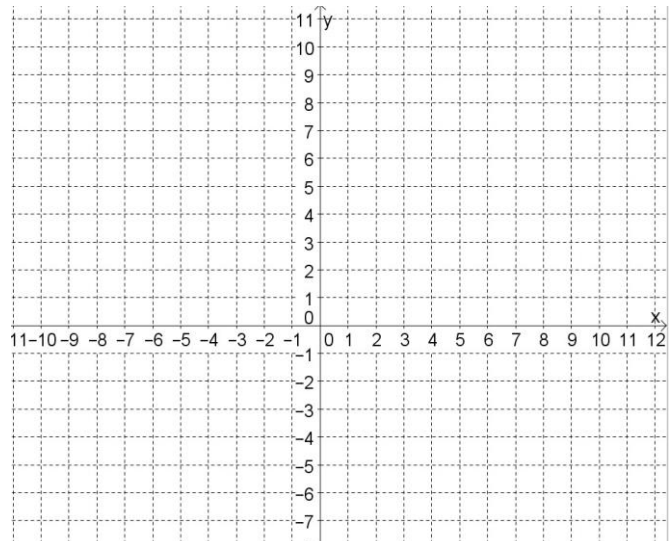


23

GROUP ACTIVITY



Plot your ordered pairs onto the Cartesian plane



24

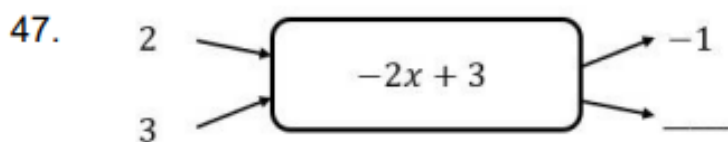
2025 GEC QUESTIONS

41.

x	-3	$-\frac{1}{4}$	0	$0,5$	$2\frac{1}{2}$
y	9	$\frac{1}{16}$	0	$0,25$	P

Determine the value of P .

- A $\frac{9}{2}$
- B $6\frac{1}{4}$
- C $4\frac{1}{4}$
- D $\frac{10}{4}$



What is the missing output value?

- A -1
- B 7
- C -3
- D 9

48.

x	0	1	2
y	5	8	11

Which equation represents the relationship shown in the table?

- A $y = x + 5$
- B $y = 3x + 5$
- C $y = x + 11$
- D $y = 5x + 3$

49.

x	k	-2	0	3
y	-13	-7	-1	8

The table is represented by the equation $y = 3x - 1$.

What is the value of k ?

- A -3
- B -4
- C -42
- D -40