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## Patterns and Linear Functions

Unit 4 Lesson 2

# PATTERNS AND LINEAR FUNCTIONS

## Students will be able to:

Represent a relationship using a table, graph, words, ordered pairs and functions

## Key Vocabulary:

- Patterns
- Table, Graph, Words
- Ordered pair
- Linear Function



## Patterns and their Representations

In mathematics, anything arranged following a certain rule or a set of rules represent a pattern. The relation represented in a pattern can be represented in the following ways:

- **Table**
- **Graph**
- **Ordered Pairs**
- **Words**
- **Equation**

## PATTERNS AND LINEAR FUNCTIONS

### Representation using table:

A table is made using the data in the patterns. There is an input and corresponding output associated with each input.

### Representation using graph:

A graph can be made using the input and output values from the patterns.

### Representation using ordered pairs:

The relationship between the data can also be represented using ordered pairs  $(x, y)$  where  $x$  represents input and  $y$  represents output.

## PATTERNS AND LINEAR FUNCTIONS

### Representation using words:

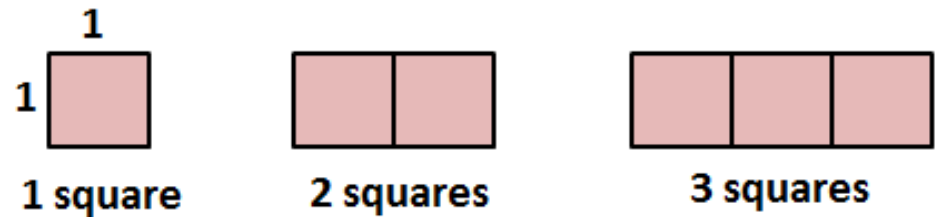
A relationship in a pattern can also be represented using words by using words for the mathematical operations like “**times**” for multiplication.

### Representation using an equation:

An equation can be used to represent the relation between variables using the equation notation like “ $y = ax + b$ ”.

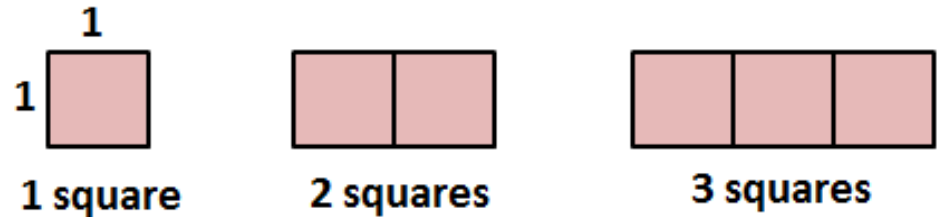
# PATTERNS AND LINEAR FUNCTIONS

**Problem 1:** For each diagram given below, find the relation between the number of shapes and the perimeter of the figure they form. Represent this relationship using a table, words, an equation and a graph.



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Using Table:

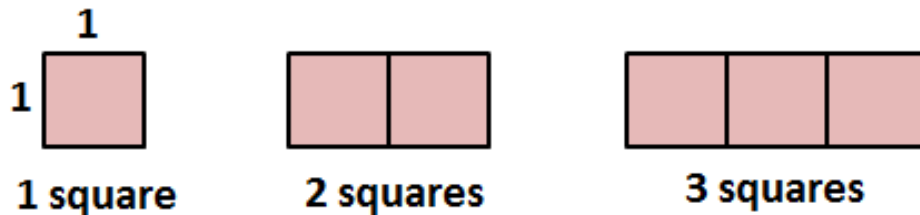
Number of Squares	1	2	3
Perimeter	4	6	8

Using Words:

The pattern shows that the perimeter is two more than twice the number of squares.

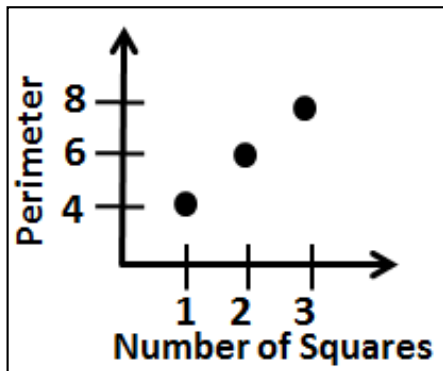
# PATTERNS AND LINEAR FUNCTIONS

**Problem 1:** For each diagram given below, find the relation between the number of shapes and the perimeter of the figure they form. Represent this relationship using a table, words, an equation and a graph.



**Using Equation:**  $Perimeter = 2(number\ of\ squares) + 2$

**Using Graph:**

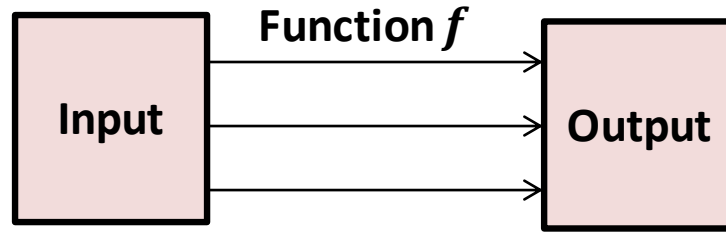




# PATTERNS AND LINEAR FUNCTIONS

## Function

A function is a relation in which each input is related to one and only one output.



## Linear Function

A function is a linear function whose graph makes a line.

**PATTERNS AND LINEAR FUNCTIONS**

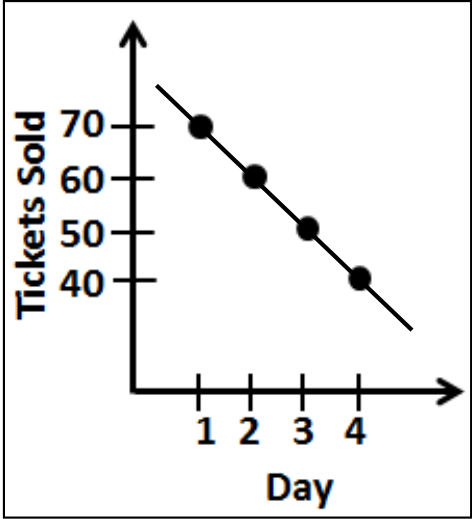
**Problem 2:** Identify whether the data shown in the table represents a function or not. If yes, is the function linear?

Day	Tickets Sold
1	70
2	60
3	50
4	40

# PATTERNS AND LINEAR FUNCTIONS

**Problem 2: Identify whether the data shown in the table represents a function or not. If yes, is the function linear?**

For each value of input (Day), we have one and only one value of output (Ticket). So **it is a function.**



Day	Tickets Sold
1	70
2	60
3	50
4	40

The graph of the function is a straight line, so it is a **linear function.**