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Patterns and Linear Functions Guided Notes

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**

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 ($\boldsymbol{x}$,$\boldsymbol{y}$) where $\boldsymbol{x}$ represents input and $\boldsymbol{y}$ represents output.

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 "$\boldsymbol{y = ax + b}$".

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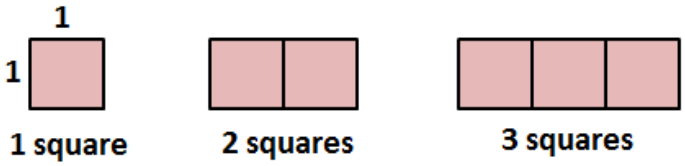
Problem 1: For each diagram given below, find the relation between the number of shapes and the perimeter of the figure they form. Represent this relationship using a table, words, an equation and a graph.



Using Table:

Number of Squares	1	2	3
Perimeter	4	6	8

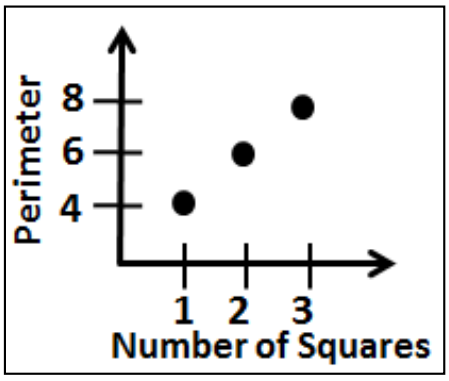
Using Words:

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

Using Equation:

$$Perimeter = 2(number\ of\ squares) + 2$$

Using Graph:



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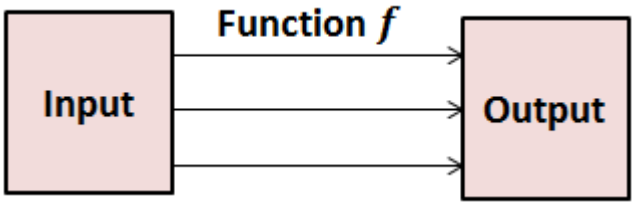
Patterns and Linear Functions Guided Notes

Function

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



Linear Function

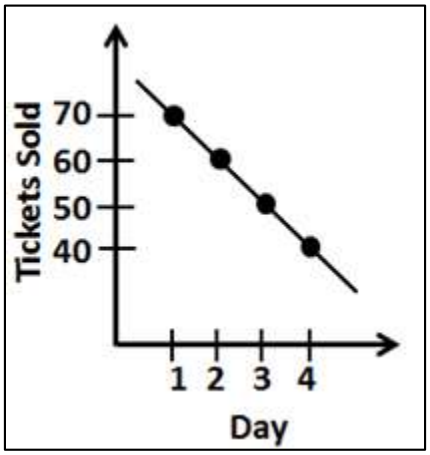
A function is a linear function whose graph makes a line.

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

Graph:



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