Patterns, Equations, and Graphs

Unit 1 Lesson 9

Students will be able to:

use tables, equations, and graphs to describe the relationships.

Key Vocabulary:

- Solutions to an equation with two variables
- Ordered Pair
- Table
- Equation
- Graph
- Inductive Reasoning

SOLUTION OF AN EQUATION containing two variables, x and y, is any ordered pair (x, y) that makes the equation true.

ORDERED PAIR – is a set of numbers or coordinates written in the form (x, y). It can be used to show the position on a graph, where the x (horizontal) value is first, and the y (vertical) value is second.

Sample Problem 1: **Tell whether the given order pair is a solution of each equation.**

A. Is $(30, 3)$ a solution of the equation $x - 14 = 5y$?

B. Is $(12, 5)$ a solution of the equation $4x + 2 = 10y$?

C. Is $(7, 1)$ a solution of the equation $8x - 6 = 50y$?

Sample Problem 1: Tell whether the given order pair is a solution of each equation.

A. Is $(30, 3)$ a solution of the equation $x - 14 = 5y$?

$$30 - 14 = 5(3) \quad \rightarrow \quad 30 - 14 = 15 \quad \rightarrow \quad 16 \neq 15$$

B. Is $(12, 5)$ a solution of the equation $4x + 2 = 10y$?

$$4(12) + 2 = 10(5) \quad \rightarrow \quad 48 + 2 = 50 \quad \rightarrow \quad 50 = 50$$

C. Is $(7, 1)$ a solution of the equation $8x - 6 = 50y$?

$$8(7) - 6 = 50(1) \quad \rightarrow \quad 56 - 6 = 50 \quad \rightarrow \quad 50 = 50$$

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There are various ways to show the relationship between two variables:

A. Create a **TABLE** to show the corresponding values of x and y,

Example: John is three years younger than his brother Matthew. Construct a table that represents their age.

John	Matthew
1	4
2	5
3	6
4	7

B. Write an **EQUATION**, or.

Example: John is three years younger than his brother Matthew. Write an equation that represents their age.
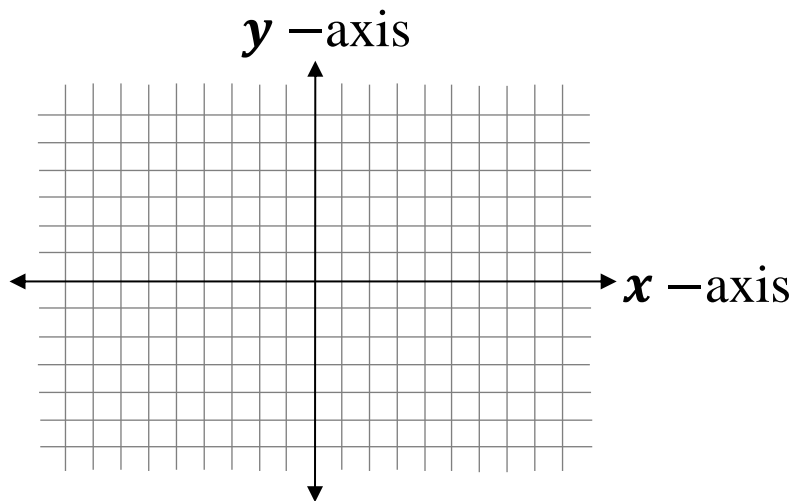
Let : J=John's age

M=Matthew's age

$$J + 3 = M$$

C. Draw a **GRAPH**.

   COORDINATE SYSTEM is a two-dimensional number line. This is a typical coordinate system: The horizontal axis is called the x −axis and the vertical axis is called the y −axis

y −axis

x −axis

C. Draw a **GRAPH**.

Example: John is three years younger than his brother Matthew. Draw a graph that represents their age.
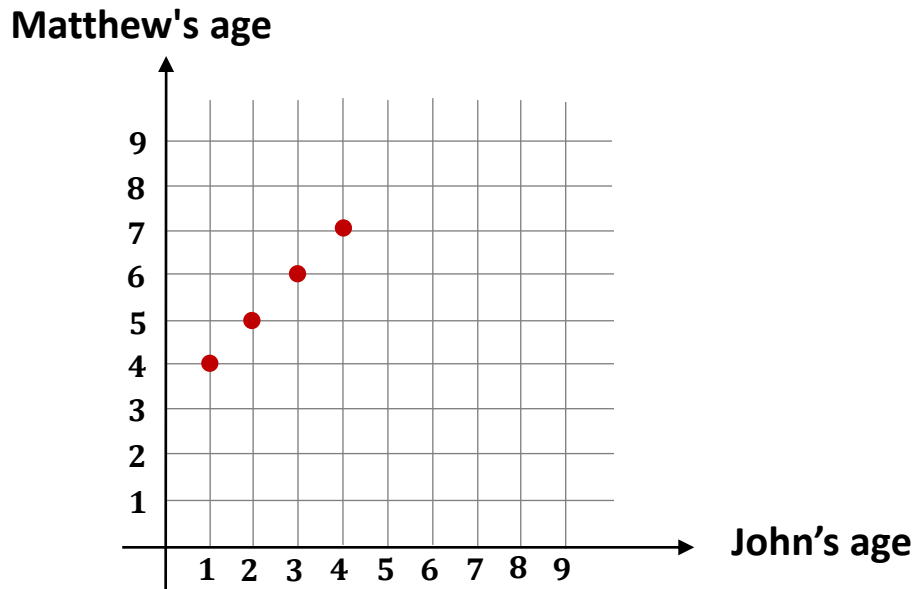
Matthew's age

John's age

Sample Problem 2: Use a table, an equation, and a graph to represent the relationship of Mary's and Ann's age.

Mary is 2 years older than Ann.

Sample Problem 2: Use a table, an equation, and a graph to represent the relationship of Mary's and Ann's age.

Mary is 2 years older than Ann.

Mary	Ann
1	3
2	4
3	5
4	6

Let : J=John's age
M=Mary's age

$$A + 2 = M$$
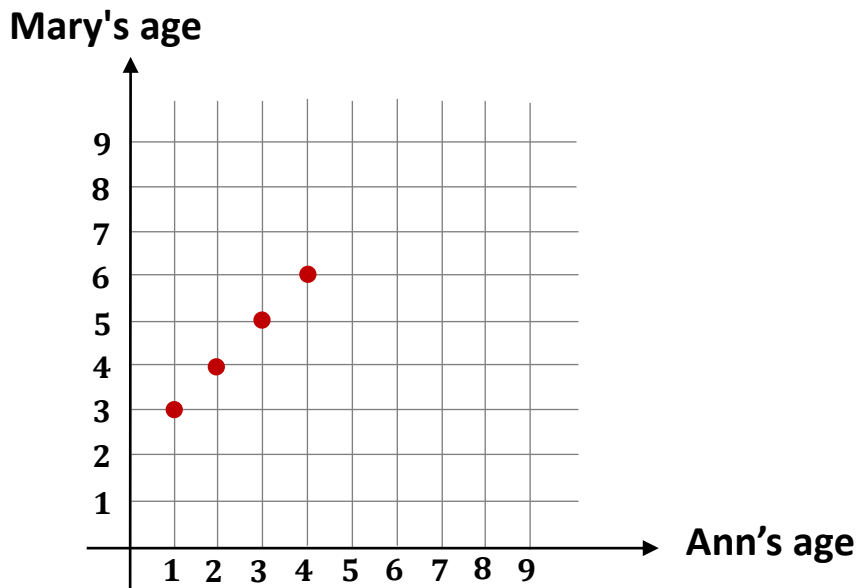
Mary's age

Ann's age

INDUCTIVE REASONING is the process of reaching a conclusion based on an observed pattern. It is used to predict values.

Example 4: Predict the next figure in the given sequence.
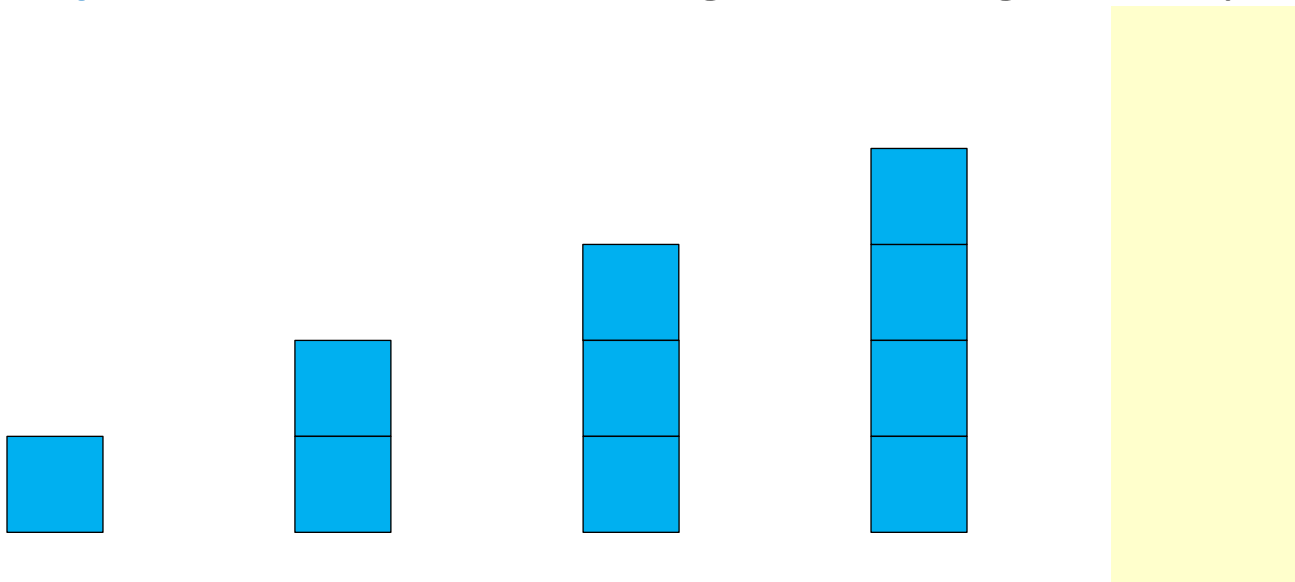
INDUCTIVE REASONING is the process of reaching a conclusion based on an observed pattern. It is used to predict values.
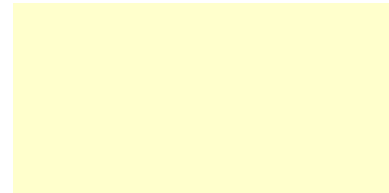
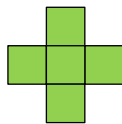**Example 4:** Predict the next figure in the given sequence.

Sample Problem 3: Predict the next figure in the each sequence.

A.

i.   ii.   iii.   iv.

B.
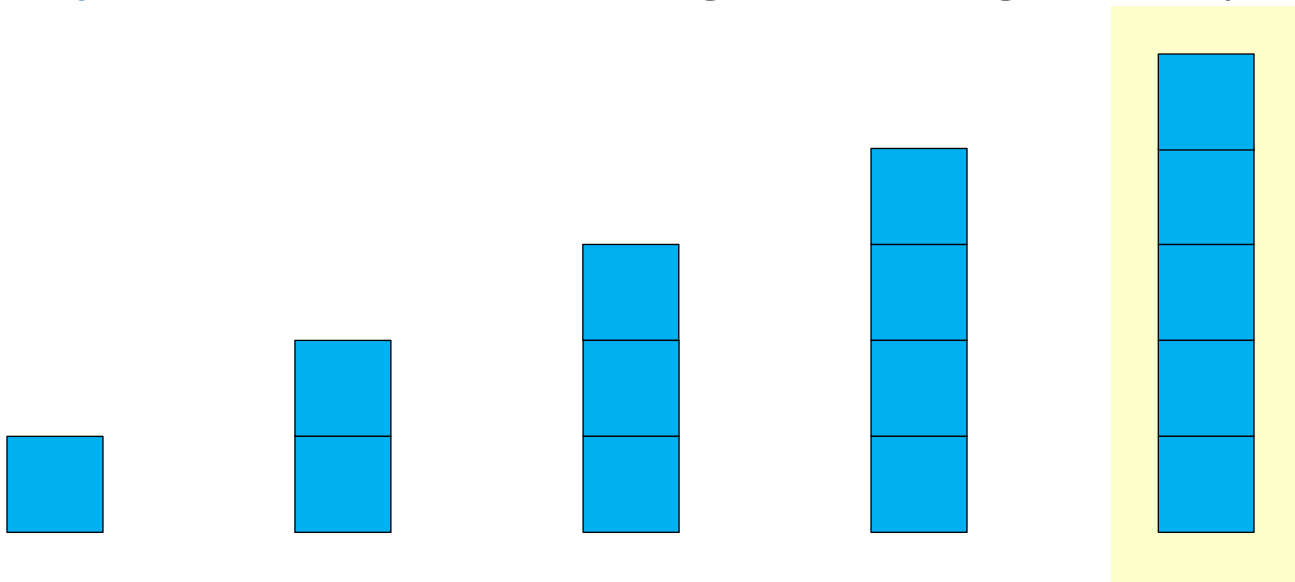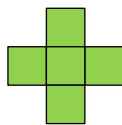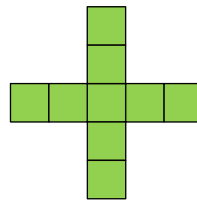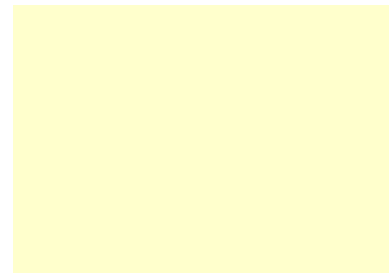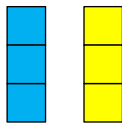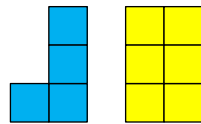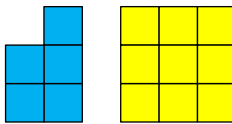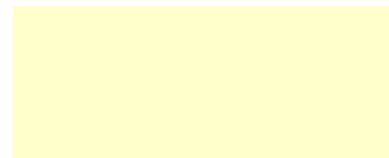
i.   ii.   iii.   iv.

C.

i.   ii.   iii.   iv.

Sample Problem 3: Predict the next figure in the each sequence.
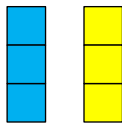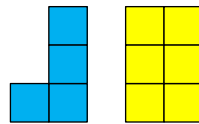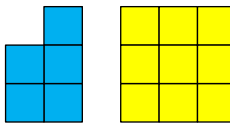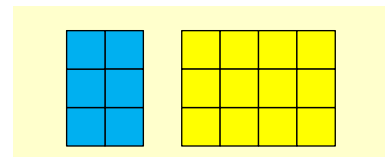
A.

i.   ii.   iii.   iv.

B.

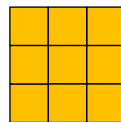i.   ii.   iii.   iv.

C.

i.   ii.   iii.   iv.

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