Template: Study Material

<Course Code:22103>: <Subject Code: BMS>: <Subject Name: Basic Mathematics>: <Topic Name: Logarithm>: <UO1> : <Study Material>

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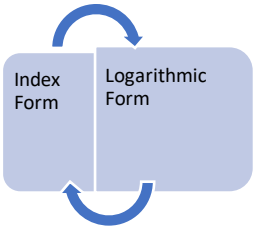
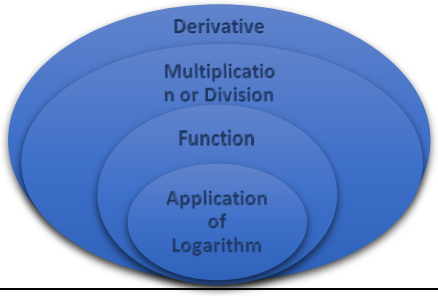
Key words: Index Form, Logarithmic form	Learning Objective: **Solve the given simple problem based on laws of logarithm.**	Diagram/ Picture **If $2^4 = 16$ then $\log_2 16 = 4$** 
Key Questions: Did you know the logarithmic form? Have you wondered how to add or subtract two logarithms?	Concept Map 	
	Definition: If $y = a^x$, $a > 0$, $a \neq 1$, $a \in R$, then x is called logarithm of y to the base a and it is written as $x = \log_a y$. For example, 1) If $8 = 2^3$ then $3 = \log_2 8$ 2) If $3^4 = 81$ then $\log_3 81 = 4$ **Note:** i) $a^x = y$ is called Exponential form or Index form and $x = \log_a y$ is called Logarithmic form of the same expression. ii) Logarithm of negative number and zero are not defined. **LAWS OF LOGARITHM:** 1. $\log_a (m \times n) = \log_a m + \log_a n$ 2. $\log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$ 3. $\log_a (m)^n = n \log_a m$ 4. $\log_n m = \frac{\log_a m}{\log_a n}$ **Note:** 1. $a^0 = 1 \therefore \log_a 1 = 0$ 2. $a^1 = a \therefore \log_a a = 1$ 3. $a^{\log_a y} = y$	Key Definitions/ Formulas **Definition: If $y = a^x$, $a > 0$, $a \neq 1$, $a \in R$, then x is called logarithm of y to the base a and it is written as $x = \log_a y$.** **LAWS OF LOGARITHM:** **$\log_a (m \times n) = \log_a m + \log_a n$** **$\log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$** **$\log_a (m)^n = n \log_a m$** **$\log_n m = \frac{\log_a m}{\log_a n}$**
Solved word Problem. **Evaluate:** $\log_2 8 + \log_2 3 - \log_2 6$ **Solution:** Using laws of logarithm $\log_2 8 + \log_2 3 - \log_2 6$ $= \log_2 \left(\frac{8 \times 3}{6}\right)$ $= \log_2 4$ $= \log_2 (2^2)$ $= 2 \times \log_2 2$ $= 2 \times 1 = 2$		
	Application of Concept/ Examples in real life: It is used to deal with multiplication and division of more number of functions.	Link to YouTube/ OER/ video: https://www.khanacademy

Key Take away from this LO: Laws of logarithm