NUMBER SYSTEM – LOGARITHMS (ADVANCED + CHANGE OF BASE)

1. CHANGE OF BASE CONCEPT

The change of base formula is used when logarithms have bases that are difficult to evaluate directly. This concept is extremely important in placement aptitude exams.

Formula: log■(b) = log(b) / log(a) (The base of both numerator and denominator must be the same)

Solved Examples – Change of Base

- Example 1: log■(10) = log(10) / log(2)
- Example 2: log■(64) = log(64) / log(4) = 3
- Example 3: log■(2) = log(2) / log(8) = 1/3

2. IMPORTANT LOGARITHMIC IDENTITIES

- log■(b) × log_b(a) = 1
- log■(b) × log_b(c) = log■(c)
- log■(b) × log_b(c) × log_c(a) = 1

Solved Examples – Log Identities

- Example 4: log■(5) × log■(3) = 1
- Example 5: log■(4) + log■(16) = 2 + 2 = 4
- Example 6: log■(16) / log■(4) = 4 / 2 = 2

3. COMMON PLACEMENT TRICKS

- If numerator and denominator are same logs, value is 1
- Convert all logs to same base before simplifying
- Replace logs with exponent form when confused

4. PRACTICE QUESTIONS (HOMEWORK)

- 1. Find value of log■(4)
- 2. Simplify: log■(25) / log■(5)
- 3. Evaluate: log■(32) × log■(9) / log■(16)
- 4. Find value of log■(81) + log■(27)
- 5. Prove: log■(b) × log_b(c) × log_c(a) = 1

5. ANSWERS (FOR SELF-CHECK)

- 1. 2/3
- 2. 2
- 3. 5
- 4. 4 + 3 = 7
- 5. Proven using change of base formula