

● LIVE CLASS 11th APPLIED MATHS

BACKLOG MARATHON

S E R I E S

1. Binary Numbers
2. Indices
3. Logarithm





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TO CLASS



Unit 1

Number Quantification & Numerical Application

1. **Binary Numbers** ✓
2. **Indices, Logarithms** ✓
3. **Quantitative aptitude**

- Calendar
- Clock
- Time Work
- Time Speed Distance
- Seating Arrangement



Class 11th | Applied Maths

Binary Numbers

Chapter 1



Contents

1. **Basic Concepts..**
2. **Conversion of Decimal Numbers to Binary Numbers..**
3. **Conversion of Binary Numbers to Decimal Numbers..**
4. **Binary Arithmetic..**



Numbers

10

↑

Decimal Number System

Digits $\rightarrow 10 \rightarrow$ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Base $\Rightarrow 10$

$$\begin{array}{c}
 25 \Rightarrow 2 \times 10 + 5 \times 1 \\
 \downarrow \downarrow \\
 \text{Ten's} \quad \downarrow \text{unit's place}
 \end{array}$$

$$\begin{array}{c}
 135 = 1 \times 100 + 3 \times 10 + 5 \times 1 \\
 \downarrow \quad \quad \downarrow \quad \quad \downarrow \\
 10^2 \quad \quad 10^1 \quad \quad 10^0
 \end{array}$$



Numbers

Binary Number System

↓
2

↓
Digits = 2



Base = 2



Difference between Decimal Number System & Binary Number System

Basis of diff.	Decimal No. System	Binary No. System
No. of Digits Base	10 [0, 1, - - 9] 10 $\rightarrow$ power of 10	2 $\Rightarrow$ [0, 1] 2 $\Rightarrow$ power of 2.

Power of 2

$$2^0 = 1$$

$$2^1 = 2$$

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = 16$$

$$2^5 = 32$$

$$2^6 = 64$$

$$2^7 = 128$$

$$2^8 = 256$$

$$2^9 = 512$$

$$2^{10} = 1024$$

$$2^{-1} = \frac{1}{2} = 0.5$$

$$2^{-2} = \frac{1}{4} = 0.25$$

$$2^{-3} = \frac{1}{8} = 0.125$$

$$2^{-4} = \frac{1}{16} = 0.0625$$



Requirements

Powers of 2

Table of 2

Division.



How to Convert

Decimal Number into Binary



825 $\rightarrow$ decimal no. system

$(825)_{10}$

$(101)_{10}$

$(101)_2$



Convert the following decimal numbers to the binary numbers:

394

	Quotient	Remainder
	394	
2	197	0
2	98	1
2	49	0
2	24	1
2	12	0
2	6	0
2	3	0
2	1	1

$$(394)_{10} = (110001010)_2$$



Convert the following decimal numbers to the binary numbers:

639

	Quotient	Remainder
2	639	
2	319	1
2	159	1
2	79	1
2	39	1
2	19	1
2	9	1
2	4	0
2	2	0
2	1	1

$$(639)_{10} = (1001111111)_2$$



Common Mistake



- ① Division
- ② Remainder
- ③ Arrow



Convert the following decimal numbers to the binary numbers:

1018

	Quotient	Remainder
2	1018	
2	509	0
2	254	1
2	127	0
2	63	1
2	31	1
2	15	1
2	7	1
2	3	1
	1	1

$$(1018)_{10} = (1111111010)_2$$



Conversion of Decimal Fraction to Binary



$$0.625 \times 2 = 1.25$$

$$0.250 \times 2 = 0.500$$

Convert the following decimal numbers to binary numbers:

$$\underline{39.625} \Rightarrow (100111.101)_2$$

$$(0.625)_{10} = (0.101)_2$$

$$(39)_{10}$$

$$= (100111)_2$$

	Quotient	R
2	39	
2	19	1
2	9	1
2	4	1
2	2	0
	1	0



Particulars	Decimal	Integer
0.625×2	0.250	1
0.250×2	0.500	0
0.500×2	0.000	1





Convert the following decimal numbers to binary numbers:

$$213.75 = (11010101.11)_2$$

$$(0.75)_{10} = (0.11)_2$$

$$(213)_{10} = (11010101)_2$$

	Q	R
2	213	
2	106	1
2	53	0
2	26	1
2	13	0
2	6	1
2	3	0
	1	1



Particulars	Decimal	Integer
0.75×2	0.50	1
0.50×2	0.00	1





How to Convert

Binary Number into Decimal

$$\begin{array}{cccc} & 1 & 1 & 1 & 0 \\ & \downarrow & \downarrow & \downarrow & \downarrow \\ 10^3 & 10^2 & 10^1 & 10^0 & \end{array}$$

$$(1110)_{10} = 1 \times 1000 + 1 \times 100 + 1 \times 10 + 0 \times 1$$

$$(1110)_2$$



Convert the following binary numbers to the decimal numbers:

1011101111

$$\begin{array}{rcl}
 1 \times 2^9 & = & 512 \\
 0 \times 2^8 & = & 000 \\
 1 \times 2^7 & = & 128
 \end{array}$$

$$\begin{array}{rcl}
 1 \times 2^6 & = & 064 \\
 1 \times 2^5 & = & 032 \\
 0 \times 2^4 & = & 000 \\
 1 \times 2^3 & = & 008 \\
 1 \times 2^2 & = & 004 \\
 1 \times 2^1 & = & 002 \\
 1 \times 2^0 & = & 001
 \end{array}$$

$$\begin{array}{r}
 512 \\
 128 \\
 \hline
 640
 \end{array}$$

$$(1011101111)_2 = (640)_{10}$$



Convert the following binary numbers to the decimal numbers:

110110110

$$\begin{aligned} 1 \times 2^8 &= 256 \\ 1 \times 2^7 &= 128 \\ 0 \times 2^6 &= 000 \end{aligned}$$

$$\begin{aligned} 1 \times 2^5 &= 032 \\ 1 \times 2^4 &= 016 \\ 0 \times 2^3 &= 000 \\ 1 \times 2^2 &= 004 \\ 1 \times 2^1 &= 002 \\ 0 \times 2^0 &= 000 \\ \hline &438 \\ \hline \end{aligned}$$

$$(110110110)_2 = (438)_{10}$$



Convert the following binary numbers to the decimal numbers:

100010001

Challenge
One



How to Convert

Fractional Binary Number into Decimal



Convert the following binary numbers to the decimal numbers:

$$\underline{110101.101} \Rightarrow 53.625$$

$\downarrow$ $\downarrow$
 53 0.625

$$\begin{array}{rcl}
 1 \times 2^5 & = & 32 \\
 1 \times 2^4 & = & 16 \\
 0 \times 2^3 & = & 00 \\
 1 \times 2^2 & = & 04 \\
 0 \times 2^1 & = & 00 \\
 1 \times 2^0 & = & 01 \\
 \hline
 & & 53
 \end{array}$$

$$\begin{array}{rcl}
 1 \times 2^{-1} & = & 1 \times \frac{1}{2} = 0.500 \\
 0 \times 2^{-2} & = & 00.00 \\
 1 \times 2^{-3} & = & 1 \times \frac{1}{8} = 0.125 \\
 \hline
 & & 0.625
 \end{array}$$

$$232.\underline{54}$$

↓

$$2 \times 100 + 3 \times 10 + 2 \times 1 + 5 \times \frac{1}{10} + 4 \times \frac{1}{100}$$



Binary Addition

1. $0 + 0 = 0$

2. $0 + 1 = 1$

3. $1 + 0 = 1$



4. $1 + 1 = (2)_{10} = (10)_2 \Rightarrow \overset{1}{\curvearrowright} 0$

5. $1 + 1 + 1 = (3)_{10} = (11)_2 \Rightarrow \overset{1}{\curvearrowright} 1$

6. $1 + 1 + 1 + 1 = (4)_{10} = (100)_2 \Rightarrow \overset{1}{\curvearrowright} \overset{0}{\curvearrowright} 0$

✓
$$\begin{array}{r|l} 2 & 2 \\ \hline & 10 \end{array}$$

$$\begin{array}{r|l} 2 & 3 \\ \hline & 11 \end{array}$$

$$\begin{array}{r|ll} 2 & 4 & \\ \hline 2 & 2 & 0 \\ & 1 & 0 \end{array} \uparrow$$



Perform the following binary additions:

(i)
$$\begin{array}{r} 101101 \\ + 11001 \\ \hline \end{array}$$

$$\begin{array}{r} 1011 \\ + 1101 \\ \hline 10011 \\ \hline \end{array}$$



Perform the following binary additions:

(ii)
$$\begin{array}{r} 11011 \\ + 1001010 \\ \hline \end{array}$$

$$\begin{array}{r} 11011 \\ + 1001010 \\ \hline 1100101 \\ \hline \end{array}$$

$$(10001)_2 + (1101)_2 = (11110)_2$$

$$(17)_{10} + (13)_{10} = (30)_{10}$$

$$30 = 30$$

Add the following binary numbers and check the result by converting them to decimal system:
10001 and 1101

$$\begin{array}{r} 10001 \\ + 1101 \\ \hline 11110 \end{array}$$

$$\begin{array}{l} 1 \times 2^4 = 16 \\ 0 \times 2^3 = 0 \\ 0 \times 2^2 = 0 \\ 0 \times 2^1 = 0 \\ 1 \times 2^0 = 1 \\ \hline 17 \end{array}$$

$$\begin{array}{l} 1 \times 2^3 = 08 \\ 1 \times 2^2 = 04 \\ 0 \times 2^1 = 00 \\ 1 \times 2^0 = 01 \\ \hline 13 \end{array}$$

$$\begin{array}{l} 1 \times 2^4 = 16 \\ 1 \times 2^3 = 08 \\ 1 \times 2^2 = 04 \\ 1 \times 2^1 = 02 \\ 0 \times 2^0 = 00 \\ \hline 30 \end{array}$$



Binary Subtraction

$$0 - 1 = 1$$

$$1. \quad 0 - 0 = 0$$

$$2. \quad 1 - 0 = 1$$

$$3. \quad 0 - 1 = 1 \text{ \& borrowed from left.}$$



$$\begin{array}{r} 10 \\ - 11 \\ \hline 01 \end{array}$$



Subtract the following binary numbers.

11010 from 110101

$$\begin{array}{r}
 \cancel{1}^1 \cancel{0}^0 \ 1 \ 0 \ 1 \\
 - \quad \quad 1 \ 1 \ 0 \ 1 \ 0 \\
 \hline
 \quad \quad 1 \ 1 \ 0 \ 1 \ 1
 \end{array}$$

$$(10111)_2 - (10000)_2 = (111)_2$$

$$23 - 16 = 7$$

$$7 = 7 //$$

Subtract the following binary numbers and check the result by converting them to decimal system:

10000 from 10111

$$\begin{array}{r} 10111 \\ - 10000 \\ \hline 00111 \\ \hline \end{array}$$

$$\begin{aligned} 1 \times 2^4 &= 16 \\ 0 \times 2^3 &= 00 \\ 1 \times 2^2 &= 04 \end{aligned}$$

$$\begin{aligned} 1 \times 2^1 &= 02 \\ 1 \times 2^0 &= 01 \\ \hline 23 \end{aligned}$$

$$\begin{aligned} 1 \times 2^4 &= 16 \\ 0 \times 2^3 &= 00 \\ 0 \times 2^2 &= 00 \\ 0 \times 2^1 &= 00 \end{aligned}$$

$$\begin{aligned} 0 \times 2^0 &= 00 \\ \hline 16 \end{aligned}$$

$$\begin{aligned} 1 \times 2^2 &= 04 \\ 1 \times 2^1 &= 02 \\ 1 \times 2^0 &= 01 \\ \hline 7 \end{aligned}$$



Binary Multiplication

$$\textcircled{1} \quad 1 \times 1 = 1$$

$$\textcircled{2} \quad 1 \times 0 = 0$$



Multiply the following binary numbers and check the result by converting
them to decimal system:

11010 and 111

H.W

$$\begin{array}{r}
 11010 \\
 \times 111 \\
 \hline
 11010 \\
 11010x \\
 11010xx \\
 \hline
 1011010
 \end{array}$$



Multiply the following binary numbers and check the result by converting them to decimal system:
10111 by 1001

$$\begin{array}{r}
 10111 \\
 \times 1001 \\
 \hline
 10111 \\
 00000X \\
 00000XX \\
 0111XXX \\
 \hline
 11001111
 \end{array}$$



Binary Division

- ① $1 \div 1 = 1$
- ② $0 \div 1 = 0$
- ③ $1 \div \underline{0} = \text{not defined.}$



$$1+1+1+1=4=100$$

10
0

Divide the following binary numbers and check the result by converting them to decimal system:

1110101 by 1001

$$\begin{array}{r}
 1001 \overline{) 1110101} \\
 \underline{- 1001} \downarrow \\
 01011 \downarrow \\
 \underline{- 1001} \downarrow \\
 001001 \downarrow \\
 \underline{- 1001} \\
 000
 \end{array}$$

$$Q = 1101$$

$$R = 00$$



Divide the following binary numbers and check the result by converting them to decimal system:

11100 by 111

= 100

$$\begin{array}{r}
 111 \overline{) 11100} \quad 100. \\
 \underline{- 111} \downarrow \downarrow \\
 0000
 \end{array}$$



The decimal equivalent of the binary number 10101 is

- (a) 21
- (b) 12
- (c) 22
- (d) 31

Challenge Que 2

↑ Base



The value of radix in binary number system is

- (a) 1
- (b) 2
- (c) 8
- (d) 10

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Indices and Logarithms

Chapter 2



Introduction

$$64 = 4 \times 4 \times 4$$

$$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

Value $\leftarrow 64 = 2 \rightarrow$ Base

6 $\rightarrow$ power / indices / exponent

VBP rule

$$125 = 5 \times 5 \times 5 = 5^3$$

value $\rightarrow 81 = 9 \times 9 = 9^2$

Exponential form



Laws of Indices

$$1. \ a^0 = 1$$

$$a \neq 0$$

0^0 is not defined

$$2^0 = 1$$

$$\left(\frac{1}{5}\right)^0 = 1$$

$$x^0 = 1$$

$$(2.5)^0 = 1$$

2. $a^{-m} = \left(\frac{1}{a}\right)^{+m}$

eg $4^{-3} = \left(\frac{1}{4}\right)^{+3}$

eg $\left(\frac{2}{3}\right)^{-2} = \left(\frac{3}{2}\right)^{+2}$

Special case = $a^{-1} = \left(\frac{1}{a}\right)^{+1} = \frac{1}{a}$

3.

$$a^m \times a^n = a^{m+n}$$

eg: $5^2 \times 5^4 = 5^{2+4} = 5^6$

X $5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^6$

Base same
operⁿ $\Rightarrow$ multⁿ
Power = add

4.

$$a^m \div a^n = a^{m-n}$$

$$\frac{5^{10}}{5^2} = 5^{10-2} = 5^8$$

Base same

Operation division

Powers $\rightarrow$ subtract //

$$\textcircled{1} \quad 8^9 \div 8^4 = 8^{9-4} = 8^5$$

2/4

$$\textcircled{2} \quad \left(\frac{1}{24}\right)^{-1} = 24^{+1} = 24$$

$$\textcircled{3} \quad 3^{19} \times 3^5 = 3^{19+5} = 3^{24}$$

$$\textcircled{4} \quad (4.758)^0 = 1$$

6.

$$a^m \times b^m = (a \times b)^m$$

Base is different

opⁿ $\Rightarrow$ multipⁿ

power $\Rightarrow$ common

eg: $4^3 \times 7^3 = (4 \times 7)^3$

$$(15)^5 = (5 \times 3)^5 = 5^5 \times 3^5 //$$

⑧ If $a^m = b^m$

Base = diff.

LHS = RHS

Power same
then $a = b$

If $a^m = b^m$
then $a = b$

$m \neq 0$

$2^0 = 3^0$

$2 \neq 3$

g. If $a^m = a^n$

Base same

$$\text{LHS} = \text{RHS}$$

$$\text{then } m = n$$

$$\text{If } a^m = a^n$$

$$\text{then } m = n$$

$$2^3 = 2^x$$

$$x = 3 //$$

$$a \neq 1$$

$$1^2 = 1^3$$

$$2 \neq 3$$

10. Fractional indices

$$7^2 = 49$$

$$\sqrt{49} = 7$$

$$= (49)^{\frac{1}{2}} = 7$$

$$\sqrt[3]{49} = (49)^{\frac{1}{3}}$$

$$\sqrt[5]{64} = (64)^{\frac{1}{5}}$$

$$\sqrt[n]{a} = a^{\frac{1}{n}}$$



चमगादड़ Property

$$x^3 = 4\frac{1}{3}$$

$$x \Rightarrow 4\frac{1}{3}$$

$$x = 4\frac{1}{3} //$$



$$= \sqrt[7]{(57)^{\frac{1}{4}}}$$



Simplify the following:

$$\left(\frac{-2x^2}{y^3}\right)^3$$

$$(a^m)^n = a^{m \times n}$$

$$\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$$

$$a^m \times b^m = (a \times b)^m$$

$$\begin{aligned} & \left(\frac{-2x^2}{y^3}\right)^3 \\ &= \frac{(-2x^2)^3}{(y^3)^3} \Rightarrow \frac{(-2)^3 \times (x^2)^3}{y^9} = \frac{-8 \times x^6}{y^9} \end{aligned}$$



Simplify the following:

$$\left[\left((625)^{-1/2} \right)^{-1/4} \right]^2$$

$$\left[\left[(5^4)^{-1/2} \right]^{-1/4} \right]^2$$

$$5^{4 \times (-1/2)} \left[(5^{-2})^{-1/4} \right]^2$$

$$= \left[5^{+2 \times (+1/4)} \right]^2$$

$$(a^m)^n = a^{mn}$$

$$(5^{1/2})^2$$

$$= 5^{1/2 \times 2} = 5^1 //$$



Simplify:

$$\left(\frac{1}{4}\right)^{-2} - 3(8)^{2/3}(4)^0 + \left(\frac{9}{16}\right)^{-1/2}$$

$$\begin{aligned} & \left(\frac{4}{1}\right)^{+2} - 3 \times (2^3)^{\frac{2}{3}} \times 1 + \left(\frac{16}{9}\right)^{\frac{1}{2}} \\ & 16 - 3 \times 2^{3 \times \frac{2}{3}} + \left(\frac{4^2}{3^2}\right)^{\frac{1}{2}} \\ & 16 - 3 \times 2^2 + \left[\left(\frac{4}{3}\right)^2\right]^{\frac{1}{2}} \\ & = 16 - 12 + \left(\frac{4}{3}\right)^{2 \times \frac{1}{2}} \end{aligned}$$

$$a^{-m} = \left(\frac{1}{a}\right)^{+m}$$

$$a^0 = 1$$

$$(a^m)^n = a^{mn}$$

$$\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$$

$$\begin{aligned} & 16 - 12 + \frac{4}{3} \\ & = 4 + \frac{4}{3} = 4\frac{4}{3} \\ & = \frac{16}{3} // \end{aligned}$$



Simplify the following:

$$\left[8^{-4/3} \div 2^{-2} \right]^{+1/2}$$

$$a^{-m} = \left(\frac{1}{a} \right)^{+m}$$

$$(a^m)^n = a^{m \times n}$$

$$a^m \div a^n = a^{m-n}$$

$$\begin{aligned} & \left[(2^3)^{-\frac{4}{3}} \div 2^{-2} \right]^{\frac{1}{2}} \\ & \left[2^{3 \times (-\frac{4}{3})} \div 2^{-2} \right]^{\frac{1}{2}} \\ & \left[2^{-4} \div 2^{-2} \right]^{\frac{1}{2}} \end{aligned}$$

$$\begin{aligned} & \left[2^{-4} - (-2) \right]^{\frac{1}{2}} \\ & = \left[2^{-4} + 2 \right]^{\frac{1}{2}} \\ & = \left[2^{-2} \right]^{\frac{1}{2}} \Rightarrow 2^{-2 \times \frac{1}{2}} \\ & = 2^{-1} = \frac{1}{2} \end{aligned}$$



$$a^0 = 1$$

$$(a^m)^n = a^{mn}$$

Simplify the following:

$$(81)^{3/4} - \left(\frac{1}{32}\right)^{-2/5} + (8)^{1/3} \left(\frac{1}{2}\right)^{-1} (2)^0$$

$$\begin{aligned}
 & (3^4)^{\frac{3}{4}} - (32)^{\frac{2}{5}} + (2^3)^{\frac{1}{3}} \times 2^{-1} \times 1 \\
 &= 3^{4 \times \frac{3}{4}} - (2^8)^{\frac{2}{5}} + 2^{3 \times \frac{1}{3}} \times 2 \\
 &= 3^3 - 2^2 + 4 \\
 &= 27 - 4 + 4 \\
 &= 27 //
 \end{aligned}$$



Simplify the following:

$$\frac{\sqrt{2^2} \times \sqrt[4]{256}}{\sqrt[3]{64}} - \left(\frac{1}{2}\right)^{-2}$$

$$\frac{2 \times 4}{4} - 2^{+2}$$

$$= 2 - 4 = -2$$

$$\text{II} \quad \sqrt[n]{a} = a^{\frac{1}{n}}$$

$$a^m = \left(\frac{1}{a}\right)^{-m}$$

$$(a^m)^n = a^{m \times n}$$

$$\frac{(2^2)^{\frac{1}{2}} \times (4^4)^{\frac{1}{4}}}{(4^3)^{\frac{1}{3}}} - 2^{+2}$$

$$\frac{2^{2 \times \frac{1}{2}} \times 4^{4 \times \frac{1}{4}}}{4^{3 \times \frac{1}{3}}} - 4$$

$$= 2 - 4 = -2 //$$



CA foundation //

If $a = c^z$, $b = a^x$, $c = b^y$, prove that $xyz = 1$

↓
①

↓
②

↓
③

$$a = c^z$$

$$a = (b^y)^z$$

from eq ③

$$a = b^{yz}$$

$$a = (a^x)^{yz}$$

from eq ②

$$a = a^{xyz}$$

$$\Rightarrow xyz = 1 \quad \text{Hence proved.}$$

$$(a^m)^n = a^{mn}$$

If $a^m = a^n$
then $m = n$



CA foundation

$$a^m \times a^n = a^{m+n}$$

If $a^m = a^n$ then $m = n$

If $2^x = 3^y = 6^{-z}$, prove that $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$.

$$2^x = 3^y = 6^{-z} = k$$

$$\begin{aligned} 2^x &= k & 3^y &= k & 6^{-z} &= k \\ 2 &= k^{\frac{1}{x}} & 3 &= k^{\frac{1}{y}} & 6 &= k^{-\frac{1}{z}} \\ & & & & \downarrow \\ & & & & 3 \times 2 &= k^{-\frac{1}{z}} \\ & & & & k^{\frac{1}{y}} \times k^{\frac{1}{x}} &= k^{-\frac{1}{z}} \end{aligned}$$

$$k^{\frac{1}{y} + \frac{1}{x}} = k^{-\frac{1}{z}}$$

$$\frac{1}{x} + \frac{1}{y} = -\frac{1}{z}$$

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$$

Hence proved.



If $x^4y^2z^3 = 49392$, find the values of x, y and z , where x, y and z are different positive primes.

$$49392 = x^4 \times y^2 \times z^3$$

$$= 2^4 \times 3^2 \times 7^3$$

on comparing

$$x = 2, y = 3, z = 7 //$$

2	49392
2	24696
2	12348
2	6174
3	3087
3	1029
7	343
7	49
7	7
	1



Solve the following equations for x

$$\left(\sqrt{\frac{3}{5}}\right)^{x+1} = \frac{125}{27}$$

$$\begin{aligned} \left[\left(\frac{3}{5}\right)^{\frac{1}{2}}\right]^{x+1} &= \frac{5^3}{3^3} \\ \left(\frac{3}{5}\right)^{\frac{1}{2}(x+1)} &= \left(\frac{5}{3}\right)^3 \\ \left(\frac{3}{5}\right)^{\frac{1}{2}(x+1)} &= \left(\frac{3}{5}\right)^{-3} \end{aligned}$$

$$\begin{aligned} \sqrt[n]{a} &= a^{\frac{1}{n}} \\ (a^m)^n &= a^{m \times n} \end{aligned}$$

$$\begin{aligned} \frac{a^m}{b^m} &= \left(\frac{a}{b}\right)^m \\ a^{-m} &= \left(\frac{1}{a}\right)^{+m} \end{aligned}$$

$$\begin{aligned} \text{If } a^m &= a^n \\ \text{then } m &= n \end{aligned}$$

$$\begin{aligned} \frac{1}{2}(x+1) &= -3 \\ x+1 &= -6 \\ x &= -6-1 \\ x &= -7 \end{aligned}$$



Simplify the following:

$$5^{n+2} - 6.5^{n+1}$$

$$13.5^n - 2.5^{n+1}$$

$$\begin{aligned} & \frac{5^n \times 5^2 - 6 \times 5^n \times 5^1}{13 \times 5^n - 2 \times 5^n \times 5^1} \\ &= \frac{\cancel{5^n} (5^2 - 6 \times 5)}{\cancel{5^n} (13 - 2 \times 5)} \end{aligned}$$

$$5^{n+2} = 5^n \times 5^2$$

$$a^{m+n} = a^m \times a^n$$

$$\frac{25 - 30}{13 - 10} = -\frac{5}{3} //$$



Simplify the following:

$$\left(\frac{x^m}{x^n}\right)^{m+n} \left(\frac{x^n}{x^l}\right)^{n+l} \left(\frac{x^l}{x^m}\right)^{l+m}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

$$(a+b)(a-b) = a^2 - b^2$$

$$(x^{m-n})^{m+n} \times (x^{n-l})^{n+l} \times (x^{l-m})^{l+m}$$

$$x^{(m-n)(m+n)} \times x^{(n-l)(n+l)} \times x^{(l-m)(l+m)}$$

$$x^{m^2-n^2} \times x^{n^2-l^2} \times x^{l^2-m^2} \times x$$

$$= x^{\cancel{m^2} - \cancel{n^2} + \cancel{n^2} - \cancel{l^2} + \cancel{l^2} - \cancel{m^2}}$$

$$= x^0 = 1 //$$

$$a^m \times a^n = a^{m+n}$$

$$a^0 = 1$$



If $a^x = b^y = c^z$ and $b^2 = ac$ prove that $y = \frac{2xz}{x+z}$.

$$a^x = b^y = c^z = k$$

$$a^x = k, b^y = k, c^z = k$$

$$a = k^{\frac{1}{x}} \quad b = k^{\frac{1}{y}} \quad c = k^{\frac{1}{z}}$$

$$b^2 = ac$$

$$\begin{aligned} \left(k^{\frac{1}{y}}\right)^2 &= k^{\frac{1}{x}} \times k^{\frac{1}{z}} \\ &= k^{\frac{2}{y}} = k^{\frac{1}{x} + \frac{1}{z}} \end{aligned}$$

$$\frac{2}{y} = \frac{2 \times 1}{2 \times x} + \frac{1 \times x}{2 \times x}$$

$$\frac{2}{y} = \frac{x+z}{2x}$$

$$\frac{2 \times 2 \times x}{x+z} = y //$$

Hence proved.

$$(a^m)^n = a^{mn}$$

$$a^m \times a^n = a^{m+n}$$

If $a^m = a^n$
then $m = n$



♡ vimp

CA Foundation =

$$x+y-(x-y)$$

$$= \cancel{x}+y-\cancel{x}+y=2y=2 \times 3=6 //$$

If $x = \sqrt[3]{28}$ and $y = \sqrt[3]{27}$, find the value of

$$x = (28)^{\frac{1}{3}}$$

$$y = 27^{\frac{1}{3}}$$

$$y = (3^3)^{\frac{1}{3}}$$

$$y = 3^{3 \times \frac{1}{3}} = 3$$

$$x+y - \frac{1}{x^2+xy+y^2}$$

$$a^3-b^3=(a-b)(a^2+b^2+ab)$$

$$x^3-y^3=(x-y)(x^2+y^2+xy)$$

$$(28^{\frac{1}{3}})^3 - 3^3 = (x-y)(x^2+y^2+xy)$$

$$= 28^{\frac{1}{3} \times 3} - 27$$

$$= 28 - 27 = 1 = (x-y)(x^2+y^2+xy)$$

$$\frac{1}{x^2+y^2+xy} = x-y$$

Tea Break



Class will resume
at 7:30 pm



will start with

logarithm Get ready... !!





Introduction to Logarithm

Any positive real no.

Exponential
form

Logarithmic form.

Value $81 = 3 \times 3 \times 3 \times 3$

$\swarrow$ $81 = 3^4$ $\rightarrow$ Exponential form

$\searrow$ Base

$$\log_3 81 = 4$$

3 ki kitni power raise karu
ki mujhe 81 mil jaaye =

$$\log_{5^p} 125^v = 3^p \Rightarrow 5^3 = 125$$

$$\log_2 32 = 5 \Rightarrow 2^5 = 32$$

$$\log_{11} 121 = 2 \Rightarrow 11^2 = 121 //$$

If $a^n = b$

$$\log_a b = n$$

$n \Rightarrow$ power $\Rightarrow$ any real no. [decimal, fractions, 0, positive, negative)

Base = $a > 0, a \neq 1$

Value = $b > 0$



Convert the following to logarithmic form:

$$(0.3)^3 = 0.027 \rightarrow \checkmark$$

↓
B

$$\log_{0.3} 0.027 = 3$$



Convert the following to logarithmic form:

$$3^{-2} = \frac{1}{9}$$

$$\log_3 \frac{1}{9} = -2$$



Convert the following to logarithmic form:

$$(81)^{3/4} = 27$$

$$\log_{81} 27 = \frac{3}{4}$$



Convert the following to exponential form:

$$\log_8 32 = \frac{5}{3}$$

(Handwritten annotations: 'B' with an arrow pointing to the base 8, and 'P' with an arrow pointing to the power 5/3)

$$= 8^{\frac{5}{3}} = 32$$



Convert the following into exponential form:

$$\log_8 4 = \frac{2}{3}$$

$$8^{\frac{2}{3}} = 4$$

$$8^{\frac{2}{3}} \Rightarrow 8^{2 \times \frac{1}{3}}$$

$$\begin{array}{c} | \\ \hline (8^2)^{\frac{1}{3}} \qquad (8^{\frac{1}{3}})^2 \end{array}$$

$$\textcircled{2} \times \frac{1}{3}$$

$$(8^2)^{\frac{1}{3}} \qquad 8^{2 \times \frac{1}{3}}$$

$$(8^{\frac{1}{3}})^2 = 8^{2 \times \frac{1}{3}}$$



Find the value of the following (by converting to exponential form):

$$\log_3 \frac{1}{3}$$

$$\text{Let } \log_3 \frac{1}{3} = x$$

$$\Rightarrow 3^x = \frac{1}{3}$$

$$= 3^x = 3^{-1}$$

$$\Rightarrow x = -1$$

$$a^{-m} = \left(\frac{1}{a}\right)^{+m}$$

$$\text{If } a^m = a^n$$

$$\text{then } m = n \quad \Rightarrow$$



Find the value of the following (by converting to exponential form):

$$\log_{\sqrt{2}} 8$$

$$\sqrt[n]{a} = a^{\frac{1}{n}}$$

$$(a^m)^n = a^{mn}$$

$$\text{let } \log_{\sqrt{2}} 8 = x$$

$$(\sqrt{2})^x = 8$$

$$(2^{\frac{1}{2}})^x = 2^3$$

$$2^{\frac{x}{2}} = 2^3$$

$$\frac{x}{2} = 3$$

$$x = 6 //$$

$$\text{If } a^m = a^n \\ \text{then } m = n$$



By converting to exponential form, find the values of:
 $\log_{0.5} 256$

$$\begin{aligned}\text{Let } \log_{0.5} 256 &= x \\ &= (0.5)^x = 256 \\ &= \left(\frac{1}{2}\right)^x = 256 \\ &= (2)^{-x} = 2^8\end{aligned}$$

$$\begin{aligned}-x &= 8 \\ x &= -8\end{aligned}$$



Solve for x:

$$\log_9 27 = 2x + 3$$

$$9^{2x+3} = 27$$

$$= (3^2)^{2x+3} = 3^3$$

$$= 3^{2(2x+3)} = 3^3$$

$$= 4x + 6 = 3$$

$$= 4x = 3 - 6$$

$$x = -\frac{3}{4}$$

$$(a^m)^n = a^{m \times n}$$

$$\text{If } a^m = a^n \\ \text{then } m = n$$



Solve for x:
 $\log_2(x^2-4) = 5$

$$2^5 = x^2 - 4$$

$$32 = x^2 - 4$$

$$x^2 = 32 + 4$$

$$x^2 = 36$$

$$x = \sqrt{36}$$

$$x = \pm 6$$

$$\log_2(x) = 5$$

$$V = x^2 - 4$$

$$= (-6)^2 - 4 = 36 - 4 = 32$$



Laws of Logarithms

1.

$$\log_a 1 = 0$$

$$\log_{10} 1 = 0$$

$$\log_{0.5} 1 = 0$$

$$a^0 = 1$$

2.

$$\log_a a = 1$$

eg: $\log_2 2 = 1$

$$\log_3 3 = 1$$

$$2^1 = 2$$

3. $\log_{\frac{1}{a}} a = -1$

$$\log_{\frac{1}{5}} 5 = -1$$

$$\begin{aligned} & \left(\frac{1}{5}\right)^{-1} \\ &= 5^{+1} \end{aligned}$$

4. $\text{If } \log_a x = \log_a y$
then $x = y$

log on both sides

$$\text{LHS} = \text{RHS}$$

Base = same

Then values become equal

eg: $\log_{10} x = \log_{10} 2$
 $x = 2$

5. $\log_a m + \log_a n = \log_a m \times n$

Both terms have log

Base same

$op^n \Rightarrow$ addition

Values get multiplied

eg: $\log_5 3 + \log_5 2 = \log_5 3 \times 2 = \log_5 6$

$$\log_{10} 8 \times 7 \\ \Rightarrow \log_{10} 8 + \log_{10} 7$$

6. $\log_a m - \log_a n = \log_a \left(\frac{m}{n}\right)$

Both have log

Base same

$\text{op}^n = \text{sub}^n$

Values will get divided

eg: $\log_5 24 - \log_5 4 = \log_5 \frac{24}{4} = \log_5 6$

Alert $\Rightarrow$

$$\log_{10} x + \log_{10} 3 \Rightarrow \log_{10} 3x$$

$$\log_{10}(5+x) \quad \times \quad \text{property}$$

$$\log_{10}(5-x) \quad \times \quad \text{property.}$$

7.

$$\log_a m^n = n \log_a m$$

eg: $\log_{10} 5^3$

$$\Rightarrow 3 \log_{10} 5$$

eg: $4 \log_{10} 2$

$$= \log_{10} 2^4$$

//

8. $\log_a n^m = \frac{1}{n} \log_a^m$

$\log_{2^3} 4 = \frac{1}{3} \log_2 4$

9) Base Change Formula

$$\log_b a \Rightarrow \frac{\log a}{\log b}$$

$$\log_2 3 \Rightarrow \frac{\log_{10} 3}{\log_{10} 2}$$

$$(10) \quad a^{\log_a x}$$

$$a^{\log_a x} = x$$

$$2^{\log_2 x} = x$$

When base is not
mentioned in the
ques

Types of logarithm [on the basis of base]

Common
logarithm
↓
Base 10

Natural → Calculus
logarithm
↓

Base = e

$e \Rightarrow$ exponential
Constant
 $= 2.71828$



Expand the following:

$$\log_b \left(\frac{4x^6}{9y^7} \right) \Rightarrow \log_b \frac{4 \times x^6}{9 \times y^7}$$

$$\log_a m + \log_a n = \log_a mn$$

$$\log_a m - \log_a n = \log_a \frac{m}{n}$$

$$\log_a m^n = n \log_a m$$

$$- [\log_b 9 + \log_b y^7]$$

$$= \log_b 4 + \log_b x^6 - \log_b 9 - \log_b y^7$$

$$= \log_b 2^2 + 6 \log_b x - \log_b 3^2 - 7 \log_b y$$

$$= 2 \log_b 2 + 6 \log_b x - 2 \log_b 3 - 7 \log_b y //$$



Simplify the following:

$$\log_a a - \log_b b^2 + \log_c c^3 - \log_d d^4$$

$$1 - 2(\log_b b) + 3(\log_c c) - 4(\log_d d)$$

$$\log_a a = 1$$

$$\log_a m^n = n \log_a m$$

$$= 1 - 2 \times 1 + 3 \times 1 - 4 \times 1$$

$$= 1 - 2 + 3 - 4$$

$$= 4 - 6 = -2 //$$



Simplify the following:

$$\log_a^3 - \log_a^2$$

$$\log \frac{a^3}{a^2}$$

$$= \log a //$$

$$\begin{aligned} \log_a^m - \log_a^n \\ = \log_a \frac{m}{n} \end{aligned}$$



Simplify the following:

$$\frac{\log 4}{\log 2}$$

$$\Rightarrow \frac{\log 2^2}{\log 2}$$

$$2 \times \frac{\log 2}{\log 2}$$

$$= 2 \times 1 = 2 //$$

$$\log_a m^n = n \log_a m$$



$$\log_a m^n = n \log_a m$$

Simplify the following:

$$2 \log 10^3 + 3 \log 10^{-2} - \frac{1}{3} \log 5^{-3} + \frac{1}{2} \log 4$$

$$\log_a a = 1$$

$$\log_a m + \log_a n = \log_a mn$$

$$= 3 \times 2 \times \log_{10} 10 + 3 \times (-2) \times \log_{10} 10 - \frac{1}{3} \times (-3) \log 5 + \frac{1}{2} \log 2^2$$

$$3 \times 2 \times 1 + (-6) \times 1 + \log_{10} 5 + \frac{1}{2} \times 2 \log_{10} 2$$

$$3 \times 2 - 6 + \log_{10} 5 \times 2 \Rightarrow 0 + \log_{10} 10 = 1 //$$



Simplify the following:

$$2 \log 3 - \frac{1}{2} \log 16 + \log 12$$

$$= \log 3^2 - \log 16^{\frac{1}{2}} + \log 12$$

$$= \log 9 - \log 4 + \log 12$$

$$= \log \frac{9}{4} + \log 12$$

$$= \log \frac{9}{4} \times 12^3 = \log 27 //$$

$$\log_a m^n = n \log_a m$$

$$\log_a m - \log_a n = \log_a \frac{m}{n}$$

$$\log_a m + \log_a n = \log_a m \times n$$

$$\log_b a = \frac{\log a}{\log b}$$

Simplify the following:

$$\log_b a \cdot \log_c b \cdot \log_a c$$

$$\frac{\log a}{\log b} \times \frac{\log b}{\log c} \times \frac{\log c}{\log a}$$

$$= \frac{\log a}{\log a} \times \frac{\log b}{\log b} \times \frac{\log c}{\log c}$$

$$= 1 \times 1 \times 1$$

$$= 1$$





Simplify the following:

$$\log_2(\log_2(\log_2 16))$$

$$\log_a m^n = n \log_a m$$

$$\log_a a = 1$$

$$\log_2 \log_2 (\log_2 2^4)$$

$$\log_2 \log_2 4 \log_2 2$$

$$\log_2 \log_2^{4 \times 1} \Rightarrow \log_2 \log_2^2 = \boxed{\log_2^2} \boxed{\log_2^2} = 1$$



$$\log_a^m + \log_a^n = \log_a^{mn}$$

If $a = \log_x yz$, $b = \log_y zx$, $c = \log_z xy$ then prove that

$$\frac{1}{1+a} + \frac{1}{1+b} + \frac{1}{1+c} = 1$$

Putting the values of a, b & c in LHS.

Base Change
Formula

$$\log_b a = \frac{\log a}{\log b}$$

$$\begin{aligned} &= \frac{1}{1 + \log_x yz} + \frac{1}{1 + \log_y zx} + \frac{1}{1 + \log_z xy} \\ &= \frac{1}{1 + \frac{\log yz}{\log x}} + \frac{1}{1 + \frac{\log zx}{\log y}} + \frac{1}{1 + \frac{\log xy}{\log z}} = \frac{1}{\frac{\log x + \log yz}{\log x}} + \frac{1}{\frac{\log y + \log zx}{\log y}} + \frac{1}{\frac{\log z + \log xy}{\log z}} \\ &= \frac{\log x}{\log xyz} + \frac{\log y}{\log xyz} + \frac{\log z}{\log xyz} \Rightarrow \frac{\log x + \log y + \log z}{\log xyz} \Rightarrow \frac{\log xyz}{\log xyz} = 1 \Rightarrow \text{HP} \end{aligned}$$



Solve for x:

$$\log_2(\log_3 x) = 4 \quad \text{--- P}$$

↓ ✓
B

$$2^4 = \log_3 x$$

$$P \quad 16 = \log_3 x \quad \text{--- V}$$

$$3^{16} = x \quad \text{--- B}$$

//

a

1.



Solve the following equations for x:

$$\log_x(8x-3) - \log_x 4 = 2$$

$$\log_x(8x-3) - \log_x 4 = 2$$

$$\log_x \frac{8x-3}{4} = 2$$

$$\Rightarrow x^2 = \frac{8x-3}{4}$$

$$\Rightarrow 4x^2 - 8x + 3 = 0$$

$$\log_a m - \log_a n = \log_a \frac{m}{n}$$

$$4x^2 - 6x - 2x + 3 = 0$$

$$= 2x(2x-3) - 1(2x-3) = 0$$

$$(2x-1)(2x-3) = 0$$

$$2x-1=0 \text{ or } 2x-3=0$$

$$x = \frac{1}{2}$$

$$2x = 3$$

$$x = \frac{3}{2}$$



If $\log 7 - \log 2 + \log 16 - 2\log 3 - \log \frac{7}{45} = 1 + \log n$, find n .

$$\Rightarrow \log \frac{7 \times 16}{2} - \log 3^2 - \log \frac{7}{45} - \log n = 1$$

$$\Rightarrow \log \frac{4 \times 8}{1 \times 1 \times n} = 1$$

$$= \log_{10} \frac{8 \times 8}{n} = 1$$

$$= \log_{10} \frac{64}{n} = 1$$

$$\Rightarrow 10^1 = \frac{64}{n} \Rightarrow n = 6.4$$



Solve for x:

$$\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$$

$$\Rightarrow \frac{\log x}{\log 2} + \frac{\log x}{\log 4} + \frac{\log x}{\log 16} = \frac{21}{4}$$

$$= \log x \left[\frac{1}{\log 2} + \frac{1}{\log 2^2} + \frac{1}{\log 2^4} \right] = \frac{21}{4}$$

$$= \log x \left[\frac{1}{\log 2} + \frac{1}{2 \log 2} + \frac{1}{4 \log 2} \right] = \frac{21}{4}$$

$$= \frac{\log x}{\log 2} \left[\frac{4+2+1}{4} \right] = \frac{21}{4}$$

$$\log_2^x \left[\frac{x}{y} \right] = \frac{x}{y}$$

$$\log_2^x = 3$$

$$x = 2^3 = 8 //$$



CA Foundⁿ

$$\log_a m + \log_a n = \log_a m \times n$$

$$\log_a m - \log_a n = \log_a \frac{m}{n}$$

$$\log_a m^n = n \log_a m$$

Given that $\log x = m + n$ and $\log y = m - n$, express the value of $\log \left(\frac{10x}{y^2} \right)$ in terms of m and n .

$$\log_{10} \frac{10x}{y^2} \Rightarrow \log_{10} \frac{10 \times x}{y^2}$$

$$\Rightarrow \log_{10} 10 + \log_{10} x - \log y^2$$

$$= 1 + m + n - 2 \log y$$

$$= 1 + m + n - 2(m - n)$$

$$= 1 + m + n - 2m + 2n$$

$$= 1 - m + 3n //$$

$$\begin{aligned} a^2 + b^2 + 2ab \\ x^2 + y^2 + 2xy \end{aligned}$$

If $x^2 + y^2 = 23xy$, prove that $\log \frac{x+y}{5} = \frac{1}{2}(\log x + \log y)$.

$$x^2 + y^2 + 2xy = 23xy + 2xy$$

$$= (x+y)^2 = 25xy$$

$$= \frac{(x+y)^2}{5^2} = xy$$

$$= \left(\frac{x+y}{5}\right)^2 = xy$$

Taking log on both sides

$$= \log \left(\frac{x+y}{5}\right)^2 = \log xy$$

$$= 2 \log \left(\frac{x+y}{5}\right) = \log x + \log y$$

$$= \log \left(\frac{x+y}{5}\right) = \frac{1}{2} [\log x + \log y]$$

Hence proved //

$$\log_{10} 100 = 2$$

$$\log_{10} 1000 = 3$$

$$\log_{10} \frac{1}{100} = -2$$

$$\log_{10} 20 =$$

$$\log_{10} 52$$

Base-10
Powers — integers

Base-10
Powers → fraction/
decimal

Base-10 $\Rightarrow$ power $\rightarrow$ decimal /
fraction
 $\downarrow$

Log table $\rightarrow$ decimal wali
power of 10

To find log value [10 ki decimal wali power]



no. ko express karte h



Standard Form



decimal k left me

ek digit hona chahiye



wo digit 1 to 9

234.5

$$2.345 \times 10^2$$

10 ki positive power ← decimal → right

10 ki negative power.



0.02375

$$2.375 \times 10^{-2}$$

$$n = m \times 10^p$$

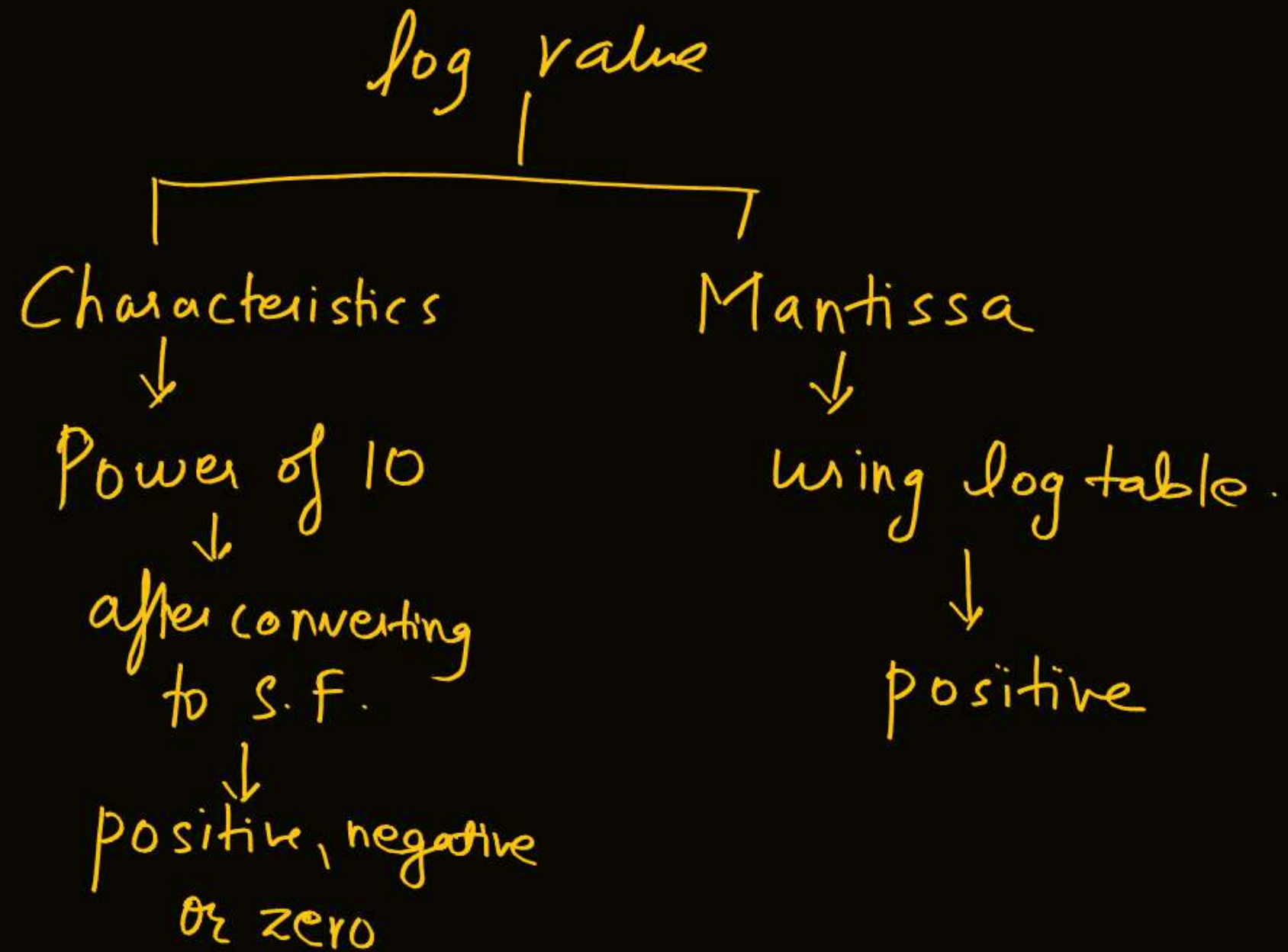
$$\log n = \log m \times 10^p$$

$$\log n = \log_{10} m + \log_{10} 10^p$$

$$\log n = \log_{10} m + p \left(\log_{10} 10 \right)$$

$$\log n \Rightarrow \log_{10} m + p$$

$$\log n \Rightarrow \begin{array}{c} \downarrow \\ \text{mantissa} \\ \downarrow \\ \text{log table} \end{array} + \begin{array}{c} \downarrow \\ \text{Characteristic} \\ \downarrow \\ \text{power of } 10 \end{array}$$





Find the characteristic of logarithms of the following numbers

(i) $43.84 \rightarrow 4384$

(ii) 538.6

(iii) 7124000.0

(iv) 9.876

	S.F.	Characteristic	M
1. 43.84	4.384×10^1	1	
2. 538.6	5.386×10^2	2	
3. 9.876	7.124×10^6	6	
		0	

$\log$
 1.6419
 2.7313

for calculating mantissa

1. log table is used
2. Ignore the decimal
3. Take first 4 significant digits

there are less than 4 significant digits
then add zeroes at end.

$$\log 23 \Rightarrow 2300$$

$$\log 8 \Rightarrow \log 8000$$

there are more than 4 significant
digits, round off the 4th wrt to 5th

$$\log 432.86 \\ = 4329$$

less than 4 $\rightarrow$ add zeroes

more than 4 $\rightarrow$ round off 4th
wrt to 5th



Find the characteristic of logarithms of the following numbers

- (i) 0.01205
- (ii) 0.00064
- (iii) 0.0000345
- (iv) 0.00000002708

		c	
	1.205×10^{-2} 6.4×10^{-4} 3.45×10^{-5} 2.708×10^{-8}	12 5 4 8	$2.0810 //$



Find the mantissa of logarithms of the following numbers

- (i) 5984
- (ii) 0.0135

Challenge Que 3



Find the mantissa of logarithms of the following numbers

(i) 0.00000008

(ii) 0.7824

Challenge Que 4



Evaluate the following numbers

(i) $\log 76$

(ii) $\log 8.39$

$$0.792 + 18 \Rightarrow 0.0810$$

I

diff.

LOGARITHMS

(43) 8 (4) M.D

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170						5	9	13	17	21	26	30	34	38
						0212	0253	0294	0334	0374	4	8	12	16	20	24	28	32	36
11	0414	0453	0492	0531	0569						4	8	12	16	20	23	27	31	35
						0607	0645	0682	0719	0755	4	7	11	15	18	22	26	29	33
12	0792	0828	0864	0899	0934						3	7	11	14	18	21	25	28	32
						0969	1004	1038	1072	1106	3	7	10	14	17	20	24	27	31
13	1139	1173	1206	1239	1271						3	6	10	13	16	19	23	26	29
						1303	1335	1367	1399	1430	3	7	10	13	16	19	22	25	29
14	1461	1492	1523	1553	1584						3	6	9	12	15	19	22	25	28
						1614	1644	1673	1703	1732	3	6	9	12	14	17	20	23	26
15	1761	1790	1818	1847	1875						3	6	9	11	14	17	20	23	26
						1903	1931	1959	1987	2014	3	6	8	11	14	17	19	22	25
16	2041	2068	2095	2122	2148						3	6	8	11	14	16	19	22	24
						2175	2201	2227	2253	2279	3	5	8	10	13	16	18	21	23
17	2304	2330	2355	2380	2405						3	5	8	10	13	15	18	20	23
						2430	2455	2480	2504	2529	3	5	8	10	12	15	17	20	22
18	2553	2577	2601	2625	2648						2	5	7	9	12	14	17	19	21
						2672	2695	2718	2742	2765	2	4	7	9	11	14	16	18	21
19	2788	2810	2833	2856	2878						2	4	7	9	11	13	16	18	20
						2900	2923	2945	2967	2989	2	4	6	8	11	13	15	17	19
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16

25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	7	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	7	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	5	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	5	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	5	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8

LOGARITHMS 7308 + 5 = 7313

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5

80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	4	4



Evaluate the following numbers

(i) $\log 0.0007 \longrightarrow \log = \bar{4}.8451$

(ii) $\log 0.00002591 \quad \log = \bar{5}.4135$

$\rightarrow 7.0 \times 10^{-4}$

ANTILOGARITHMS $2679 + 6 = 2685$

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
-00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
-01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
-02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
-03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
-04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
-05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
-06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
-07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
-08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
-09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
-10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
-11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
-12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
-13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
-14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
-15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
-16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
-17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
-18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
-19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	2	3	3
-20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	2	3	3
-21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	1	2	2	2	3	3
-22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	1	2	2	2	3	3
-23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	1	2	2	2	3	4
-24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	1	2	2	2	3	4
-25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	1	2	2	2	3	4
-26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	1	2	2	3	3	4
-27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	1	2	2	3	3	4
-28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	1	2	2	3	3	4
-29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	1	2	2	3	3	4

-30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
-31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
-32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
-33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
-34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
-35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
-36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
-37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
-38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
-39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
-40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
-41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
-42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
-43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
-44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
-45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
-46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
-47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
-48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
-49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6

$$\begin{array}{r} 3289 \\ + 2296 \\ \hline \end{array}$$

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12

.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20

Antilogarithm

$$\log_{10} \boxed{2} = 0.3010$$

$$10^{0.3010} = ? \Rightarrow \text{Antilog table}$$

↓
Value

$$\text{If } \log x = y$$

↓

To find x

$$x = \text{Antilog } y$$

How to calculate Antilog of a number

→ For eg Antilog (2.4289)

Integer part

Decimal part

positive

negative

Antilog value
k n+1 places k
baad decimal
lagayenge.

n = integer

2+1 = 3 places k baad
decimal

(n-1) zeroes add
karte h & then
place decimal

0.4289

Antilog value

using Antilog table

268.5

Integer $\rightarrow$ positive $\rightarrow$ $n+1$ places $\leftarrow$ add decimal

negative $\Rightarrow$ $n-1$ zeroes

front me & then
put decimal.

$$\overline{2} \quad 4289$$

↓

$$\cdot 02685$$

$$n-1 \text{ zeroes}$$

$$= 2-1 = 1$$

$$\overline{4} \cdot \underline{4289}$$

↓

$$\cdot 0002685$$

$$n-1 \rightarrow \text{zeroes}$$

$$4-1 = 3$$

6.4289

↓

.000002685

$$6-1=5$$



Using antilog tables, find x :

(i) $\log x = 2.5179$

(ii) $\log x = 4.8291$

1. $\log x = 2.5179$

$$x = \text{Antilog}(2.5179)$$

$$x = 329.6$$

$$2+1=3$$

$$\log x = 4.8291$$

$$x = \text{Antilog}(\underline{4}.8291)$$

$\Rightarrow$

$$67470.$$

$$x = 67470 //$$

$$4+1=$$



Using antilog tables, find x :

(i) $\log x = \bar{4}.6501$

(ii) $\log x = \bar{2}.1304$

(iii) $\log x = -2.1304$

$$x = \text{Antilog}(\bar{2}.1304)$$

$$= .01350$$

$$n-1 = 2-1 = 1$$

1. $\log x = \bar{4}.6501$

$$x = \text{Antilog}[\bar{4}.6501]$$

$$x = 0.0004468$$

$$4-1 = 3$$



$$\bar{2}.1304 \Rightarrow -2 + 0.1304$$

$$-2.1304 \\ -2 - \underline{0.1304}$$

Using antilog tables, find x :

(i) $\log x = \bar{4}.6501$

(ii) $\log x = \bar{2}.1304$

(iii) $\log x = -2.1304$

$$\begin{array}{r} 2\cancel{3}. \cancel{888}^{\cancel{999}10} \\ - 2.1304 \\ \hline 8696 \end{array}$$

$$\begin{aligned} \log x &= -2.1304 \\ &= -2 - 0.1304 \\ &= -3 + 3 - 2.1304 \\ &= \underline{\bar{3}.8696} \end{aligned}$$



Evaluate the following using log tables

$$(57.8)^{1/2} \times (0.0027)^{1/3}$$

$$\text{Let } x = (57.8)^{\frac{1}{2}} \times (0.0027)^{\frac{1}{3}}$$

Taking log on both sides

$$\log x = \log \left[(57.8)^{\frac{1}{2}} \times (0.0027)^{\frac{1}{3}} \right]$$

$$\log x = \log(57.8)^{\frac{1}{2}} + \log(0.0027)^{\frac{1}{3}}$$

$$\log x = \frac{1}{2} \log 57.8 + \frac{1}{3} \log 0.0027$$

$$\log x = \frac{1}{2} [1. —] + \frac{1}{3} [\bar{3}. —]$$

$$\log x = \frac{1.7617}{2} + \frac{\bar{3}.4314}{3}$$

$$\log x = \frac{1}{2} + \frac{\bar{3}}{3} + \frac{0.4314}{3}$$

$$0.8809 - 1 + 0.1438$$

$$\log x = \underline{\hspace{2cm}}$$

$$x = \text{Antilog} = \underline{\hspace{2cm}}$$



Evaluate the following using log tables

$$\frac{(27.8)^{1/2} \times (58.49)^{2/3}}{(0.0007)^{1/4}} \Rightarrow$$



Challenge Ques

$$\log x = \log(27.8)^{\frac{1}{2}} + \log(58.49)^{\frac{2}{3}} - \log(0.0007)^{\frac{1}{4}}$$

$$= \frac{1}{2} \log 27.8 + \frac{2}{3} \log 58.49 - \frac{1}{4} \log 0.0007$$



Calculate the Compound Interest earned on ₹300000 for 5 years at an interest of 10% per annum, when interest is compounded quarterly?

$$CI = A - P$$

$$A = P \left(1 + \frac{R}{k \times 100} \right)^{nk}$$

$$= 300000 \left[1 + \frac{10}{400} \right]^{5 \times 4}$$

$$A = 300000 \times (1.025)^{20}$$

$$\log A = \log 3,00,00 + 20 \log 1.025$$

compounded annually
 $k = 1$

half yearly = $k = 2$

quarterly = $k = 4$

monthly = $k = 12$



A new machine costs ₹640000. Its price depreciates at the rate of 10% per annum. What will be the price of the machine after 7 years?



An earthquake is measured with amplitude 30000 times as large as the smallest possible measurable amplitude A_0 . Using $R = \log_{10} \left(\frac{A}{A_0} \right)$ calculate the Richter scale with two decimal digits.

THANK YOU

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