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Maths = 40 Marks.

Chapter → 1

- Ratio
- Proportion
- Indicies
- Logrothim.

⟹ **Ratio :→**

$a : b = \frac{a \rightarrow \text{antecedent}}{b \rightarrow \text{consequent}}$

- It is a comparison of two quantities of same kind & same units

Same kind → weight – weight, Height – Height
Same unit → kg-kg, cm-cm

km			m	cm	mm

1 Hour = 60 min
1 min = 60 sec
1 Hour = 60 min × 60 sec.
= 120 sec

$2^2 = 4$ → Square
$\sqrt{4} = 2$ → Square root
$3^3 = 27$ → Cube
$\sqrt[3]{27} = 3$ → Cube root

$5 - 5 = 0$
$a - a = 0$

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

$\frac{a}{a} = 1$

Types :-

Inverse ratio → $\frac{a}{b} \rightarrow \frac{b}{a}$

Duplicate ratio → $\frac{a}{b} \rightarrow \frac{a^2}{b^2}$

Sub duplicate ratio → $\frac{a}{b} \rightarrow \frac{\sqrt{a}}{\sqrt{b}}$

Triplicate ratio → $\frac{a}{b} \rightarrow \frac{a^3}{b^3}$

Sub triplicate ratio → $\frac{a}{b} \rightarrow \frac{\sqrt[3]{a}}{\sqrt[3]{b}}$

Compounded ratio → $\frac{a}{b} \times \frac{c}{d} \times \frac{e}{f}$

⇒ Proportion :→

• Equality of two ratio

$a : b :: c : d$

↳ means

↳ Extremes

Continuous proportion =

$a : b :: c : d$

↓

$a : b :: b : c$

↳ mean proportion

↓

$b^2 = ac$

Types :-

Intertendo → $\frac{a}{b} = \frac{c}{d} \rightarrow \frac{b}{a} = \frac{d}{c}$

Alternendo → $\frac{a}{b} = \frac{c}{d} \rightarrow \frac{d}{b} = \frac{c}{a} \;\Big|\; \frac{a}{c} = \frac{b}{d}$

Componendo → $\frac{a}{b} = \frac{c}{d} \rightarrow \frac{a+b}{b} = \frac{c+d}{d}$

Dividendo → $\frac{a}{b} = \frac{c}{d} \rightarrow \frac{a-b}{b} = \frac{c-d}{d}$

Compendo-dividendo → $\frac{a}{b} = \frac{c}{d}$

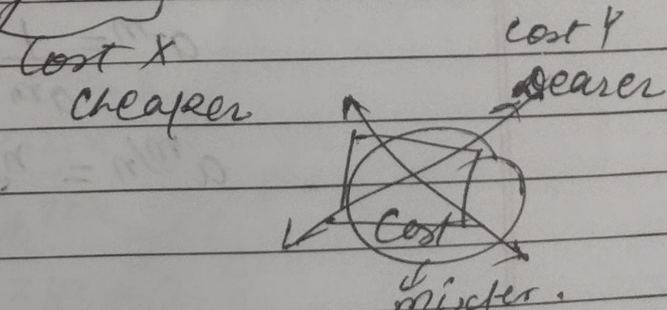
$$\Rightarrow \frac{a+b}{a-b} = \frac{c+d}{c-d}$$

Addendo → $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} \rightarrow \frac{a+c+e}{a+d+f}$

Subtratendo → $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{a-c-e}{b-d-f}$

Continued Proportion → $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e}$

Aligation



Speed = $\frac{\text{Dist}}{\text{time}}$

sum of angles of $\Delta = 180^\circ$

Proportion

4

$a : b :: c : d$

a → 1st propⁿ

b → 2nd propⁿ

c → 3rd propⁿ

d → 4th propⁿ

★ If 3 Given asked to find out 1 then it is 4wala.

3

$a : b :: b : c$

a → 1st propⁿ

b → 2nd propⁿ
- → mean propⁿ
- → Geometric Mean

c → 3rd propⁿ

★ If 2 Given asked to find out 1 then it is 3wala.

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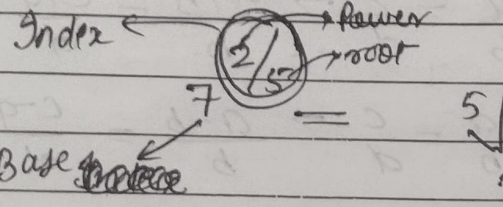
Indicies :→

$a^{(n)}$ → Power / Exponent / Index

a → Base

Index — Plural → Indicies



$= \sqrt[5]{7^2}$ root vala form

$\sqrt{}$ = 2nd root = 1/2

$2^4 = 16$

$2 = 16^{1/4}$ [side changes power becomes root]

law :-

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

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

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

$a^0 = 1$ [$5^0 = 1$]

$a^1 = a$ [$5^1 = 5$]

$a^{-m} = \frac{1}{a^m}$

$a^{m/n} = \sqrt[n]{a^m}$

$a - a = 0$

$\frac{a}{a} = 1$

$3^{(4)} = 81$

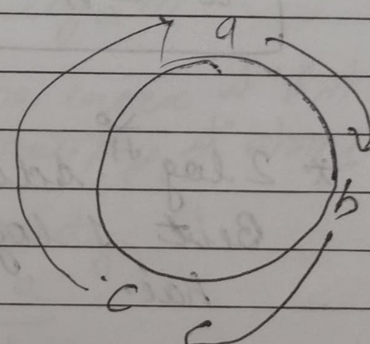
$3 = 81^{1/4}$

जब आए -ve 1st make it +ve → power में $2^{-1/8} \to \frac{1}{2^{1/8}}$ =
जब Bhi Q root form में आए too convert it into indices

formulas:→

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

Cycle order trick:-
Base में हो → 0
Power में हो → 1



Case

$x^{1/p} = y^{1/q} = z^{1/r}$

$x^{1/p} = k \to k^p$

$y^{1/q} = k \to k^q$

$z^{1/r} = k \to k^r$

$xyz = 1$

$k^p k^q k^r = k^0$

$k^{p+q+r} = k^0$

$p+q+r = 0$

whenever 3 things are equal to each other. let assume (k) constant.
Then jiska relation ptaa hai ~~usko value~~ dundhilo

Case

$a^x = b$

$b^y = c$

$c^z = a$

$a^x = b$

$(c^z)^x = b$

$b^{yzx} = b^1$

$zyx = 1$

~~whenever three things are equal. let assume~~ k
→ एक में एक घुसाओ & then start putting values.

Case $2^x \cdot 3^y \cdot 5^z = 360$

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⇒ **Logarithm:→**

$2^{5/1}$ — 2 ↙ Base; 5/1 ↘ Index

5 → Power
1 → root

| $2^5 = 32$ Indicies | → $\log_2 32 = 5$ |

log of 32 to the base of 2 is 5

$$a^m = n \rightarrow \log_a n = m$$

* 2 log में Add & Sub allowded hai
But 1 log में multiplication & division allowded hai.

* If Base nothing is given it is 10.

STATS

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Properties :→

① $\log_a m + \log_a n = \log_a mn$

② $\log_a m - \log_a n = \log_a m/n$

③ $\log_a a = 1$

④ $\log_a 1 = 0$

⑤ $\log_a m^n = n \cdot \log_a m$

[अगर कोई no. index में हैं तो bhar आएगा तो multiply में होगा & vice versa]

⑥ Change of Base Property

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

$$\log_q p = \frac{\log p}{\log q}$$