

# MATHS CHALISA

*A Complete Pocket Guide for Mathematics Formula Revision*

**In Memory**

Late Dr. Anushka Ji Surana

**Under the Guidance**

Mr. Rajeev Surana Sir

**Author**

Mr. Bhupesh Kumar Parmar

**ANUSHKA**  
**LEARNING TUBES**

# MATHS CHALISA

**Publisher :**

**ANUSHKA LEARNING TUBES**

Choudhary Market, Kayad Road, Ajmer.

E-mail - infolearningtubes@gmail.com

Contact No. : 9928082857

**ISBN : 978-81-999033-9-5**

© **All Rights Publisher's**

**First Edition : 2026**

**₹ : 250.00**

**Notice :**

Without prior written permission of the publisher no person/publisher/institute should use fullpart of the text/design/questions/diagram/material of the book. If any person/publisher/institute is found in default legal action will be taken accordingly.

Although every effort has been made to avoid mistakes and omissions, yet there may be possibility of some mistakes being left due to invisibility. Which may please be excused. This book is released with the understanding that neither the author nor the publisher will be held responsible in any manner for mistakes/omissions crept in the book. Any dispute what-so-ever shall be subject to the Ajmer Jurisdiction.



**In Memory**  
Late Dr. Anushka Ji Surana

# PREFACE

---

For students preparing for competitive examinations, Mathematics is a subject that serves as both the key to success and, at times, a challenge. It is often observed that students memorize formulas but are unable to apply them correctly at the right time. Keeping this problem in mind, “**Ganith Chalisa**” has been created.

This book is a compilation of all the important mathematical formulas, short tricks, and useful methods that are repeatedly asked in banking, SSC, railway, and other competitive examinations. The objective of this book is not only to present formulas but also to make them simple, memorable, and exam-oriented, so that students can solve more questions accurately in less time.

“Ganith Chalisa” has been designed in such a way that students can improve both their speed and accuracy by revising it repeatedly. Each topic has been presented briefly, in clear language, and with useful tricks, so that even the most complex questions appear simple.

This book is especially useful for those students who, due to lack of time, are unable to undertake detailed study but still wish to perform excellently in examinations. If, through this book, students are able to develop confidence in Mathematics, then our effort will be successful.

Finally, I dedicate this book to all those students who are continuously working hard to fulfill their dreams. Your success is the true purpose of this book.

— Author

**Bhupesh Parmar**

# – Content –

1.	Important Chart of Maths .....	1
2.	Number System .....	4
3.	LCM and HCF .....	23
4.	Fraction .....	27
5.	Average .....	32
6.	Series .....	34
7.	Binary Number .....	36
8.	Algebra .....	42
9.	Law of Surds .....	47
10.	Quadratic Equation .....	53
11.	Alligation .....	56
12.	Percentage .....	58
13.	Profit and Loss .....	62
14.	Time & Work .....	66
15.	Ratio & Proportion .....	74
16.	Interest .....	83
17.	Trigonometry .....	88
18.	Height & Distances .....	95
19.	Mensuration .....	99
20.	Probability .....	111

21.	Polygon .....	116
22.	Co-Ordinate Geometry .....	119
23.	Straight Line .....	125
24.	Sequences & Series .....	127
25.	Triangle .....	129
26.	Quadrilateral .....	132



**CHAPTER | 1 |**

**Important Chart of Maths**

**BASIC METHOD**

**Rules for Operating Integers Sign**

**Multiplication Division**

- |                         |                       |
|-------------------------|-----------------------|
| a) $(+) \times (+) = +$ | a) $(+) \div (+) = +$ |
| b) $(+) \times (-) = -$ | b) $(-) \div (-) = +$ |
| c) $(-) + (-) = +$      | c) $(-) \div (+) = -$ |
| d) $(-) \times (+) = -$ | d) $(+) \div (-) = -$ |

**BODMAS**

**Operation of Sign**

- B** - For Brackets : [ { ( - ) } ] Proceeding from (-) to [ ]
- O** - For orders (powers, Exponent or roots) ‘x’
- D** - For Division :  $\div$
- M** - For Multiplication : x
- A** - For Addition : +
- S** - For subtraction : -

**Rule of Simplification**

- i. In simplifying, first of all **vinculum** or bar must be removed for  
eg.  $-8-10 = -18$  but,  $\overline{8-10} = -(-2) = 2$
- ii. After removing the bar, remove brackets in this order ( ), { } & [ ].
- iii. After removing the brackets, follow the operations of sign.
 

a) of	b) division
c) multiplication	d) Addition    e) Subtraction

**“ This rule is a rule of “VBODMAS’ V for Vinculum”.**

**Eg. Simplify :-**

$$1 \div \frac{5}{7} \text{ of } (4 + 8 \times \overline{3-2}) + \left[ \frac{1}{3} \div \frac{3}{21} - \left\{ \frac{3}{7} + \frac{8}{14} \right\} \right]$$

**Conversion of Length**

- ☞ 10 millimeters = 1 centimeter
- ☞ 10 centimeters = 1 decimeter
- ☞ 10 decimeters = 1 meter
- ☞ 10 meters = 1 dekameter
- ☞ 10 dekameters = 1 hectometer
- ☞ 10 hectometers = 1 kilometer

**Conversion of Area**

- ☞ 100 sq. millimeters = 1 sq. centimeter
- ☞ 100 sq. centimeters = 1 sq. decimeter
- ☞ 100 sq. decimeters = 1 sq. meter
- ☞ 100 sq. meters = 1 sq. dekameter
- ☞ 100 sq. dekameters = 1 sq. hectometer
- ☞ 100 sq. hectometers = 1 sq. kilometer
- ☞ 1 hectare = 10,000 sq. meters

**Conversion of Volume**

- ☞ 1000 cubic millimeters = 1 cubic centimeter
- ☞ 1000 cubic centimeters = 1 cubic decimeter
- ☞ 1000 cubic decimeters = 1 cubic meter
- ☞ 1000 cubic meters = 1 cubic dekameter
- ☞ 1000 cubic dekameters = 1 cubic hectometer
- ☞ 1000 cubic hectometers = 1 cubic kilometer

**Conversion of Capacity**

- ☞ 10 milliliters = 1 centiliter
- ☞ 10 centiliters = 1 deciliter
- ☞ 10 deciliters = 1 liter
- ☞ 10 liters = 1 dekaliter
- ☞ 10 dekaliters = 1 hectoliter
- ☞ 10 hectoliters = 1 kiloliter

**Conversion of Weight**

- ☞ 10 milligrams = 1 centigram
- ☞ 10 centigrams = 1 decigram

- ☞ 10 decigrams = 1 gram
- ☞ 10 grams = 1 dekagram
- ☞ 10 dekagrams = 1 hectogram
- ☞ 10 hectograms = 1 kilogram
- ☞ 100 kilograms = 1 quintal
- ☞ 10 quintals (1000 kg) = 1 metric ton

### Conversion of Time

- ☞ 60 seconds = 1 minute
- ☞ 60 minutes = 1 hour
- ☞ 24 hours = 1 day
- ☞ 7 days = 1 week
- ☞ 15 days = 1 fortnight
- ☞ 28, 29, 30, and 31 days = 1 month
- ☞ 12 months = 1 year
- ☞ 365 days = 1 year
- ☞ 366 days = 1 leap year
- ☞ 10 years = 1 decade
- ☞ 25 years = Silver jubilee
- ☞ 50 years = Golden jubilee
- ☞ 60 years = Diamond jubilee
- ☞ 75 years = Platinum jubilee
- ☞ 100 years = 1 century
- ☞ 1000 years = 1 millennium

### Conversion of Units

- ☞ 12 inches = 1 foot = 0.348 meters
- ☞ 3 feet = 1 yard
- ☞ 1 yard = 0.9144 meters
- ☞ 1 meter = 1.0936 yards
- ☞ 1 kilometer = 0.621 miles or  $10^3$  meters
- ☞ 1 mile = 1.6093 km or 1760 yards
- ☞ 1 inch = 2.54 centimeters
- ☞ 1 acre = 2.471 bigha
- ☞ 1 liter = 1000 cubic centimeters
- ☞ 1 cubic meter = 1000 liters

**CHAPTER | 3 |**  
**LCM and HCF****LCM (Least Common Multiple)**

- ☞ **Factor:** One number is said to be a factor of another when it divides the other exactly. Thus 6 & 7 are factors of 42.
- ☞ **Common Factor :** A common factor of two or more numbers is a number that divides each of them exactly.
- ☞ **LCM:** The LCM of two or more given numbers is the least no which is exactly divisible by each of them.
- ⇒ Thus, 15 is a Common multiple of 3 & 5.
- ⇒ 30 is a common multiple of 3 & 5.
- ⇒ 45 is a “..... 3 & 5.
- ⇒ But 15 is the least common multiple (LCM) of 3 & 5.

**List of Method to find the LCM.****Method 1 : Method of Prime factors**

- ☞ Resolve the given numbers into their prime factors & then find the product of the highest power of all the factors that occur in the given no. This product will be the LCM

**Eg: Find LCM of 8, 12, 15, & 21.**

☞  $8 = 2 \times 2 \times 2 = 2^3$

☞  $12 = 2 \times 2 \times 3 = 2^2 \times 3$

☞  $15 = 3 \times 5$

$21 = 3 \times 7$

∴ The Required LCM =  $2^3 \times 3 \times 5 \times 7 = 840$

**Note :** The LCM of two no. s which are prime to each other is their product.

Thus LCM of 15 & 17 in  $15 \times 17 = 255$

- ☞ **Method II:** The LCM of several small number can be easily found by the following rule :

12, 15, 90, 108, 135, 150

- ☞ Divide by any one of the Prime numbers 2,3, 5, 7 etc., which will exactly divide at least any two of the given numbers. The product of all divisors and the number in the last line will be the required LCM.

**Eg:**

2	12,15,90,108,135,150
2	6,15,45,54,135,75
3	3,15,45,27,135,175
3	1,5,15,9,45,25
3	5,5,3,15,25
5	5,5,1,5,25
	1,1,1,5

∴ The required LCM =  $2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 = 2700$

**Note :** The Product of two numbers is equal to the product of their HCF & LCM.

**Eg:** The LCM & HCF of 12 & 15 are 60 & 3 respectively.

- ☞ Multiplication of two numbers =  $12 \times 15 = 180$

$$\text{HCF} \times \text{LCM} = 3 \times 60 = 180$$

- ☞ Thus, the product of two numbers is equal to the product of their LCM & HCM.

### Method III : LCM of decimals

**Eg:** Find the LCM of 0.6, 9.6 & 0.36.

**Sol.:** The given no.s are equivalent to 0.60 , 9.60 & 0.36.

Now, find the LCM of 60, 960 & 36, which is equal to 2880.

∴ The required LCM = 28.80

### Method IV : LCM of fractions

- ☞ The LCM of two or more fractions is the least fraction or integer which is exactly divisible by each of them.

$$\text{LCM} = \frac{\text{LCM of Numerator}}{\text{HCF of Denominator}}$$

## **Quadratic Equation**

☞ An equation of the form  $ax^2 + bx + c = 0$  is called a quadratic equation in one variable, where a, b, c are real number and  $a \neq 0$  It's a second degree polynomial

☞ There are various methods to solve the quadratic equation, they are

- i) Factorization
- ii) Completing the squares
- iii) Quadratic Formula
- iv) Graphical Representation

☞ In factorization method the quadratic equation is solved by splitting them into factors.

☞ In completing squares the quadratic equation is converted into either  $(a + b)^2$  or  $(a - b)^2$

☞ The quadratic formula to find the roots of quadratic equation are

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

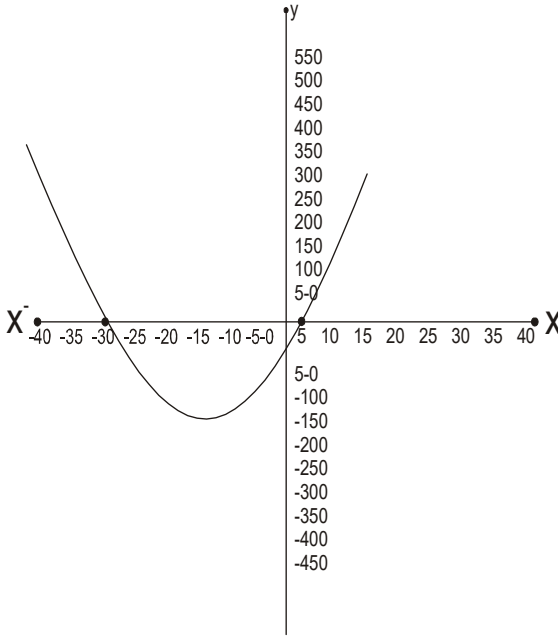
☞ Where  $\sqrt{b^2 - 4ac}$  is called the discriminate of the quadratic equation denoted by D. The sum of the roots of

☞ The quadratic equation is  $\frac{-b}{a}$  or  $\frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$  and the product of the roots of the

$$\text{Quadratic equation is } \frac{c}{a} \text{ or } \frac{\text{costant term}}{\text{coefficient of } x^2}$$

- ☞ If  $D = 0$  roots are real and equal
- ☞ If  $D > 0$  roots are real and unequal,
- ☞ If  $D < 0$  roots are imaginary

**Parabola :-**



The graph of a quadratic equation is a parabola. It depends on the value of ‘a’,

- ☞ If  $a > 0$  the parabola opens upwards,
- ☞ If  $a < 0$  parabola opens downwards.
- ☞ If  $D > 0$  parabola intersects x-axis at two distinct points,
- ☞ If  $D < 0$  parabola does not intersect the parabola and
- ☞ If  $D = 0$  parabola touches x-axis at only one point.

**Some Equation**

☞ Quadratic equation is defined as the equation  $ax^2 + bx + c = 0$

☞ Roots of the equation  $ax^2 + bx + c = 0$  are given by:

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

☞ If the roots  $\alpha$  &  $\beta$  are known then the equation is given by

$$x^2 - (\alpha + \beta)x + (\alpha \cdot \beta) = 0$$



**CHAPTER | 12 |**

**Percentage**

**Percent**

- ☞ The term percent means ‘for every hundred’. It can be defined as:
- ☞ “A fraction whose denominator is 100 is called percentage, and the numerator of the fraction is called the **rate per cent.**”

**Percentage Value**

$\frac{1}{2} = 50\%$	$\frac{1}{3} = 33\frac{1}{3}\%$	$\frac{1}{4} = 25\%$	$\frac{1}{5} = 20\%$
$\frac{1}{6} = 16\frac{2}{3}\%$	$\frac{1}{7} = 14\frac{2}{7}\%$	$\frac{1}{8} = 12\frac{1}{2}\%$	$\frac{1}{9} = 11\frac{1}{9}\%$
$\frac{1}{10} = 10\%$	$\frac{1}{11} = 9\frac{1}{11}\%$	$\frac{1}{12} = 8\frac{1}{3}\%$	$4\% = \frac{1}{25}$
$5\% = \frac{1}{20}$	$10\% = \frac{1}{10}$	$20\% = \frac{1}{5}$	$25\% = \frac{1}{4}$
$40\% = \frac{2}{5}$	$50\% = \frac{1}{2}$	$60\% = \frac{3}{5}$	$75\% = \frac{3}{4}$
$80\% = \frac{4}{5}$	$100\% = 1$	$120\% = \frac{6}{5}$	$125\% = \frac{5}{4}$
$6\frac{1}{4}\% = \frac{1}{16}$	$12\frac{1}{2}\% = \frac{1}{8}$	$37\frac{1}{2}\% = \frac{3}{8}$	$87\frac{1}{2}\% = \frac{7}{8}$
$8\frac{1}{3}\% = \frac{1}{12}$	$16\frac{2}{3}\% = \frac{1}{6}$	$66\frac{2}{3}\% = \frac{5}{8}$	$150\% = \frac{2}{3}$

**Some More Points on Percentage**

1. If two values are respex% & y% more than a third value, then the first

is the  $\frac{100+x}{100+y} \times 100\%$  of the second .

2. If A is  $x\%$  of C & B is  $y\%$  of C, then A is  $\frac{x}{y} \times 100\%$  of B
3.  $x\%$  of a quantity is taken by the first,  $y\%$  of the remaining is taken by the second &  $Z\%$  of the remaining is taken by third person, now, if A is left in the fund, then there was  $\frac{A \times 100 \times 100 \times 100}{(100 - x)(100 - y)(100 - z)}$  in the

beginning

4.  $x\%$  of a quantity is added. Again  $y\%$  of the increased quantity is added. Again,  $Z\%$  of the increased quantity is added. Now it becomes A, then the initial amount is given by

$$\frac{A \times 100 \times 100 \times 100}{(100 + x)(100 + y)(100 + z)}$$

5. The Population of a town is P. It increases by  $x\%$  during first year, increases  $y\%$  during the second year and again increases by  $Z\%$  during the third year. The population after third year will be

$$\frac{P \times (100 + x)(100 + y)(100 + z)}{100 \times 100 \times 100}$$

6. When the population decreases by  $y\%$  during the second year, while for the first and third years, it follows the same, the population after 3 years will be

$$\frac{p(100 + x)(100 - y)(100 + z)}{100 \times 100 \times 100}$$

7. If the Price of a commodity increases by  $r\%$ , then the reduction in consumption so as not to increase the expenditure, is

$$\left( \frac{r}{100 + r} \times 100 \right) \%$$

8. If the Price of a commodity decreases by  $r\%$ , then increases in consumption, so as not to decrease expenditure on this item, is

$$\left( \frac{r}{100 - r} \times 100 \right) \%$$

**CHAPTER | 13 |**

**Profit and Loss**

**Profit and Loss**

**C.P : Cost Price**

**S.P : Selling Price**

- ☞ **Cost Price:** The amount Paid to purchase an article or the price at which an article is made is known as its **cost price**.
- ☞ **Selling Price:** - The Price at which an article is sold is known as its **selling price**.
- ☞ **Profit:-** If the selling Price (**S.P**) of an article is greater than the cost price (**C.P**), the difference between the selling price and cost price is called **profit**.

**If S.P > C.P, then**

**Profit = S.P - C.P**

- ☞ **Loss:-** If the selling price (S.P) of an article between the cost price (C.P) and the selling price (S.P) is called loss.

☞ If C.P > S.P, then

☞ Loss = C.P - S.P

☞ Sell /sold/ Selling means S.P.

☞ Buy /Cost/ Purchase means C.P.

☞ S.P = C.P + Profit

S.P = C.P – Loss

C.P = S.P – Profit

C.P= S.P + Loss

$$S.P. = \frac{CP \times (100 + G\%)}{100}$$

$$S.P. = \frac{CP \times (100 - L\%)}{100}$$

$$\left( \begin{array}{l} G\% = \text{Gain}\% \\ L\% = \text{Loss}\% \end{array} \right)$$

$$C.P. = \frac{SP \times 100}{100 + G\%}$$

$$C.P. = \frac{SP \times 100}{100 - L\%}$$

### Discount

#### Marked Price/List Price (M.P)

- ☞ While buying goods that on every article there is a Price marked. This price is known as the **marked price** of the article.

#### Discount

- ☞ Sometimes shopkeepers offer a certain percent of rebate on the marked Price for cash payments. This rebate is known as **discount**.

$$\text{Discount} = \text{MP} - \text{SP}$$

$$\text{Rate of Discount (Discount\%)} = \frac{\text{Discount}}{\text{MP}} \times 100$$

$$\text{S.P} = \text{M.P} - \text{Discount}$$

$$\text{SP} = \text{MP} - \frac{\text{MP} \times \text{Discount}\%}{100}$$

$$\text{SP} = \text{MP} \times \left[ 1 - \frac{\text{Discount}\%}{100} \right]$$

$$\text{SP} = \text{MP} \times \left[ \frac{100 - \text{Discount}\%}{100} \right]$$

$$\text{MP} = \frac{100 \times \text{SP}}{100 - \text{Discount}\%}$$

#### More Formulas Based on Different Possibility

$$\% \text{gain} = \frac{\text{Error}}{\text{True value} - \text{Error}} \times 100$$

$$\% \text{gain} = \frac{\text{True Weight} - \text{False Weight}}{\text{False Weight}} \times 100$$

$$\text{Total Percentage Profit} = \frac{\% \text{Profit} + \% \text{Less in Weight}}{100 - \% \text{Less in Weight}} \times 100$$