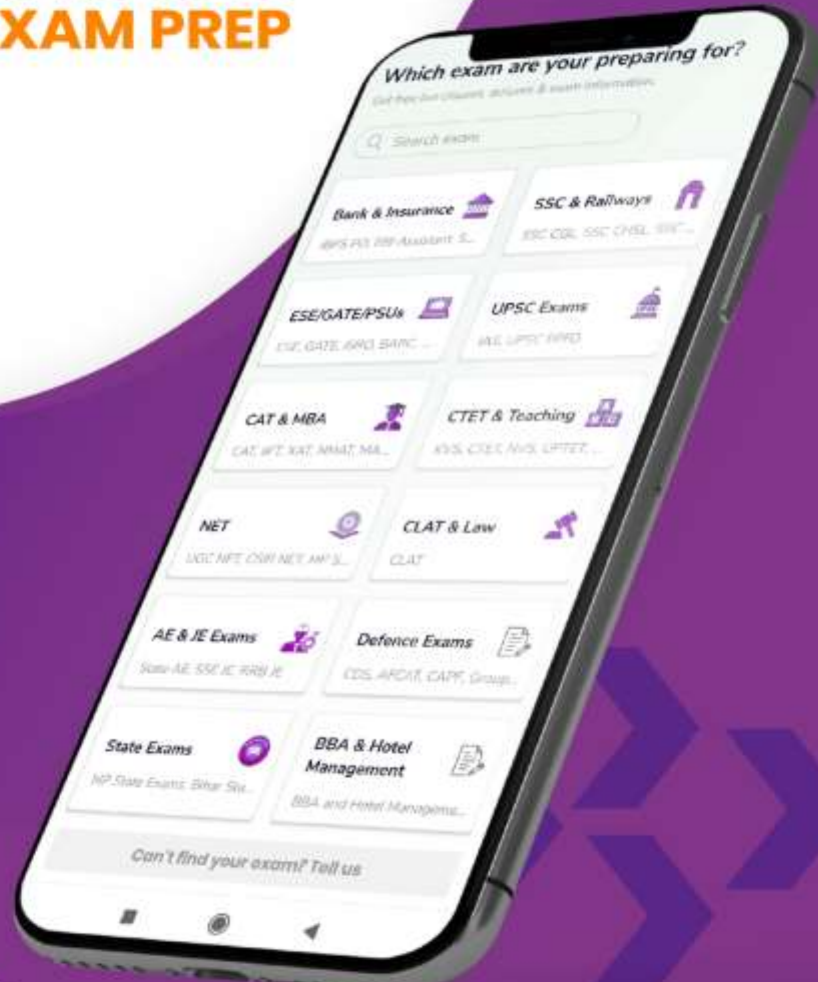
BYJU'S EXAM PREP



SSC Exams Important Maths Formulae PDF

List of Important Maths Formulae for SSC Exams 2023

Number System Quick Maths Formulas

- 1 + 2 + 3 + 4 + 5 + … + n = n (n + 1)/2
- (12 + 22 + 32 + ... + n2) = n (n + 1) (2n + 1) / 6
- (13 + 23 + 33 + ... + n3) = (n (n + 1)/ 2)2
- Sum of first n odd numbers = n2
- Sum of first n even numbers = n (n + 1)
- (a + b) * (a - b) = (a2 - b2)
- a + b)*2 = (a2 + b2 + 2ab)
- a - b)*2 = (a2 + b2 - 2ab)
- (a + b + c)*2 = a2 + b2 + c2 + 2(ab + bc + ca)
- (a3 + b3) = (a + b) * (a2 - ab + b2)
- (a3 - b3) = (a - b) * (a2 + ab + b2)
- (a3 + b3 + c3 - 3abc) = (a + b + c) * (a2 + b2 + c2 - ab - bc - ac)
- When a + b + c = 0, then a3 + b3 + c3 = 3abc

HCF and LCM Quick Maths Formulas

- Product of two numbers a and b.
- (a*b) = Their HCF * Their LCM.
- But a*b*c ≠ HCF*LCM
- HCF of two or more numbers is the most significant number, which divides them without any remainder.
- LCM of two or more numbers is the smallest number divisible by all the given numbers.

HCF and LCM Factor

- LCM of Fraction= (LCM of Numerator)/(HCF of Denominator)
- HCF of Fraction = (HCF of Numerator)/(LCM ofDenominator)
- If d = HCF of a and b, then there exist unique integer m and n, such that d = am + bn.

Some important HCF and LCM Rules- Factors and Multiples

- If number a is divided into another number b exactly, we say that a is a factor of b.
- In this case, b is called a multiple of a.

Co-primes

- Two numbers are said to be co-prime if their H.C.F. is 1.
- HCF of a given number always divides its LCM.

Simplification Quick Maths Formulas

- **'BODMAS' Rule**

  Through this rule, you can understand the correct sequence in which the operations are to be executed and

  This rule depicts the correct sequence in executing the operations and evaluating the series.

Here are some rules of simplification given below-

B – Bracket

(First of all, remove all the brackets strictly in the order (), {} and ||, and after removing the brackets, you can follow the below sequence)

O – Of

D - Division,

M - Multiplication,

A - Addition and

S - Subtraction

Problems on Ages Quick Maths Formulas

Formulas -

- If the current age is x, then n times the age is nx.
- If the current age is x, then age n years later/hence = x + n.
- If the current age is x, then age n years ago = x - n.
- The ages in a ratio a: b will be ax and bx.
- If the current age is x, 1/n times the age is x/n.

Average Quick Maths Formulas

- Average = (Total of data) / (No. of data)
- Age of New Entrant = New Average + No. of Old Members * Increase
- Weight of New Person = Weight of Removed Person + No. Of Persons * Increase In Average
- Number of Passed Candidates = Total Candidates * (Total Average – Failed Average) / (Passed Average – Failed Average)
- Number of Failed Candidates = Total Candidates * (Passed Average – Total Average) / (Passed Average – Failed Average)
- Age of New Person = Age of Removed Person – No. of Persons * Decrease in Average Age

- Average after x innings = Total Score – Increment in Average * y innings
- If a person travels a distance at a speed of x km/hr and the same distance at a speed of y km/hr, then the average speed during the whole journey is given by – 2xy / (x+y) km/hr.
- If half of the journey is travelled at a speed of x km/hr and the next half at a speed of y km/hr, then the average speed during the whole journey is 2xy / (x+y) km/hr.
- If a man goes to a particular place at a speed of x km/hr and returns to the original place at a speed of y km/hr, then the average speed during up and down journey is 2xy / (x+y) km/hr.
- If a person travels 3 equal distances at a speed of x km/hr, y km/hr, and z km/hr, respectively, then the average speed during the whole journey is 3xyz / (xy+yz+zx) km/hr.

Profit and Loss Quick Maths Formulas

- Profit = Selling Price (SP) – Cost Price (CP)
- Loss = Cost Price (CP) – Selling Price (SP)
- Gain or Loss % = (Loss or Gain / CP) * 100 %
- Gain % = [Error / (True Value – Error)] * 100 %
- Gain % = [(True Weight – False Weight) / False Weight] * 100 %
- Total % Profit = [(% Profit + % Less in wt) / (100 – % Less in wt)] * 100 %
- If CP of x articles is = SP of y articles, then **Profit % = [(x –y) / y] * 100**
- Cost Price = (100 * More Charge) / (% Diff in Profit)
- Selling Price = More Charge * (100+ First Profit%) / (% Diff in Profit).

Time and Work Quick Maths Formulas

- If M1 persons can do W1 work in D1 days and M2 persons can do W2 work in D2 days, then the formula will be - M1 * D1 * W1 = M2 * D2 * W2
- If we add Time for both the groups T1 and T2, respectively, then the formula will become – M1 * D1 * T1 * W1 = M2 * D2 * T2 * W2
- And if we add efficiency for both the groups E1 and E2 respectively, then the formula becomes – M1 * D1 * T1 * E1 * W1 = M2 * D2 * T2 * E2 * W2
- If A can do a piece of work in x days and B can do it in y days, then A and B working together will do the same work in **[(x*y)/(x+y)]**
- If A, B, and C can do a work in x, y and z days respectively, then all of them working together can finish the work in **[(x*y*z) / (xy + yz + zx)]**
- If A and B together can do a piece of work in x days and A can do it in y days, then B alone can do the work in **(x*y) / (x-y)**
- Original Number of Workers = (No. of more workers * No. of days taken by the second group) / No. of fewer days.

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Pipe & Cisterns Quick Maths Formulas

- If a pipe can fill a tank in x hours, then the part filled in 1 hour = 1/x.
- If a pipe can empty a tank in y hours, then the part of the entire tank emptied in 1 hour = 1/y.
- If a pipe can fill a tank in x hours and another pipe can empty the full tank in y hours, then the net part is filled in 1 hour, when both the pipes are opened = (1/x) – (1/y).
- Time is taken to fill the tank when the pipes are opened = xy / (y-x).
- If a pipe can fill a tank in x hours and another can fill the same tank in y hours, then the net part is filled in 1 hour, when both the pipes are opened = (1/x) + (1/y).
- Time taken to fill the tank = xy / (x+y).
- If a pipe can fill a tank in x hours and another can fill the same tank in y hours, but a third one empties the full tank in z hours and all of them are opened together, then the net part filled in 1 hour = (1/x) + (1/y) + (1/z).
- Time taken to fill the tank = xyz / (yz + xz - xy) hours.
- A pipe can fill a tank in x hours. Due to a leak in the bottom, it is filled in y hours. If the tank is full, then the leak takes time to empty the tank = xy / (y-x) hours.

Time and Distance Quick Maths Formulas

- Speed = Distance / Time
- If the body's speed is changed in the ratio a:b, then the ratio of the time taken changes in the ration b:a.
- If a certain distance is covered at x km/hr and the same distance is covered at y km/hr, then the average speed during the whole journey is 2xy / (x+y) km/hr.
- Meeting point's distance from starting point = (S1 * S2 * Difference in time) / (Difference in speed)
- Distance travelled by A = 2 * Distance of two points (a / a+b)
- Distance = [(Multiplication of speeds) / (Difference of Speeds)] * (Difference in time to cover the distance)
- Meeting Time = (First's starting time) + [(Time taken by first) * (2nd's arrival time – 1st's starting time)] / (Sum of time taken by both)

Problem on Train Quick Maths Formulas

- When x and y trains are moving in the opposite directions, then their relative speed = Speed of x + Speed of y
- When x and y trains are moving in the same direction, then their relative speed = Speed of x - Speed of y

- When a train passes a platform, it should travel the length equal to the sum of the lengths of the train & platform.
- Distance = (Difference in Distance) * [(Sum of Speed) / (Diff in Speed)]
- Length of Train = [(Length of Platform) / (Difference in Time)] * (Time taken to cross a stationary pole or man)
- Speed of faster train = (Average length of two trains) * [(1/Opposite Direction's Time) + (1/Same Direction's Time)]
- Speed of slower train = (Average length of two trains) * [(1/Opposite Direction's Time) – (1/Same Direction's Time)]
- Length of the train = [(Difference in Speed of two men) * T1 * T2)] / (T2-T1)
- Length of the train = [(Difference in Speed) * T1 * T2)] / (T1-T2)
- Length of the train = [(Time to pass a pole) * (Length of the platform)] / (Diff in time to cross a pole and platform)

Boats and Streams Quick Maths Formulas

- If the speed of the boat is x and if the speed of the stream is y while upstream, then the effective speed of the boat is = x - y
- And if downstream, then the speed of the boat = x + y
- If x km/hr is the man's rate in still water and y km/hr is the current rate. Then
- Man's rate with current = x + y
- Man's rate against current = x – y
- A man can row x km/hr in still water. If in a stream which is flowing at y km/hr, it takes him z hrs to row to a place and back, the distance between the two places is = z * (x2 – y2) / 2x
- A man rows a certain distance downstream in x hours and returns the same distance in y hours. If the stream flows at the rate of z km/hr, then the speed of the man in still water is given by – z* (x + y) / (y - x) km/hr.
- Man's rate against current = Man's rate with current – 2 * rate of current
- Distance = Total Time * [(Speed in still water)^2 – (Speed of current)^2] / 2 * (Speed in still water)
- Speed in Still Water = [(Rate of Stream) * (Sum of upstream and downstream time)] / (Diff of upstream and downstream time)

Simple Interest Quick Maths Formulas

- SI = p*t*r/100
- The annual payment that will discharge a debt of INR A due in t years at the rate of interest r% per annum is = **(100 * A) / [(100 * t) + r*t* (t-1)]/2**
- P = (Interest * 100) / [(t1*r1) + (t2*r2) + (t3*r3) + …..]
- Rate = [100 * (Multiple number of principal – 1)] / Time
- Sum = (More Interest * 100) / (Time * More Rate)

Compound Interest Quick Maths Formulas

- When Interest is compounded annually – **Amount = P [1 + (r/100)]^{t}**
- When Interest is compounded half-yearly – **Amount = P [1 + (r/200)]^{2t}**
- When Interest is compounded quarterly – **Amount = P [1 + (r/400)]^{4t}**
- When rate of Interest is r1%, r2% and r3% then – **Amount = P [1 + (r1/100)] * [1 + (r2/100)] * [1 + (r3/100)]**
- Simple Interest for 2 years = 2*r = 2r% of capital
- Compound Interest for 2 years = [2r +(r^2/100)]% of capital
- Simple Interest for 3 years = 3*r = 3r% of capital
- Compound Interest for 3 years = [3r +(3r^2/100) + (r^3/100^2)]% of capital.

Mensuration Quick Maths Formulas

- Area of Rectangle = Length * Breadth
- (Diagonal of Rectangle)^2 = (Length)^2 * (Breadth)^2
- Perimeter of Rectangle = 2 * (Length + Breadth)
- Area of a Square = (Side)^2 = 1/2 * (Diagonal)^2
- Perimeter of Square = 4 * Side
- Area of 4 walls of a room = 2 * (Length + Breadth) * Height
- Area of a parallelogram = (Base * Height)
- Area of a rhombus = 1/2 * (Product of Diagonals)
- Area of a Equilateral Triangle = Root of (3) / 4 * (Side)^2
- Perimeter of an Equilateral Triangle = 3 * Side
- Area of an Isosceles Triangle = b/4 * root of 4a^2 – b^2
- Area of Triangle = 1/2 * Base * Height
- Area of Triangle = root of [s(s – a) * (s – b) * (s-c)]
- Area of Trapezium = 1/2 * (Sum of parallel sides * perpendicular distance between them)
- Circumference of a circle = 2*(22/7)*r
- Area of a circle = (22/7) * r^2
- Area of a parallelogram = 2 * root of [s(s – a) * (s – b) * (s-d)]
- Volume of cuboid = (l*b*h)
- Whole Surface of cuboid = 2 * (lb + bh + lh) sq. units
- Diagonal of Cuboid = Root of (l^2 + b^2 + h^2)
- Volume of a cube = a^3
- Whole Surface Area of cube = (6*a^2)
- Diagonal of Cube = Root of (3) * a
- Volume of Cylinder = (22/7) * r^2 * h
- Curved Surface area of Cylinder = 2*(22/7)*r*h
- Total Surface Area of Cylinder = [2*(22/7)*r*h] + {2*(22/7)*r^2)

- Volume of Sphere = (4/3) * (22/7) * r^3
- Surface Area of Sphere = 4 * (22/7) * r^2
- Volume of hemisphere = (2/3) * (22/7) * r^3
- Curved Surface area of hemisphere = 2 * (22/7) * r^2
- Whole Surface Area of hemisphere = 3 * (22/7) * r^2.