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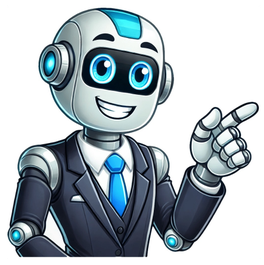

Math formulas are concise mathematical expressions that represent relationships between quantities, properties, or operations. They are used to describe and solve mathematical problems across various fields such as algebra, geometry, calculus, and statistics. Formulas often consist of variables, constants, and mathematical symbols, enabling calculations and predictions in a structured manner. These formulas serve as fundamental tools for understanding and solving mathematical problems efficiently. Essential mathematical formulas cover arithmetic operation, algebra, geometry, and more. They include equations for basic operations like addition and multiplication, as well as formulas for calculating areas, volumes, and solving equations. These formulas form the foundation of mathematical understanding and problem-solving. Download This Math Formula PDF Algebraic Formulas(+)=+2+Geometric Formulas=Trigonometric Formulassin+cos=1Calculus Formulas/(())=()Statistical Formulas=()/Probability Formulas()=()+()()Number Theory Formulas+=Differential Equations/=Matrix FormulasGeometry Formulas=4/3 Fundamental rules essential for solving algebraic problems efficiently and accurately. These formulas cover concepts like linear equations, quadratic equations, slopes, distances, and geometric shapes, forming the building blocks for more advanced algebraic manipulations. Download This Algebra Formulas PDFa b= (a b)(a + b) (a + b)= a+ 2ab + b a+ b= (a + b) 2ab (a b)= a 2ab + b (a + b + c)= a+ b+ c+ 2ab + 2bc + 2ca (a b c)= a+ b+ c 2ab + 2bc 2ca (a + b)= a+ 3ab + 3ab+ b (a b)= a 3ab + 3ab b a b= (a b)(a+ ab + b) a+ b= (a + b)(a ab + b) (a + b)= a+ 4ab + 6ab+ 4ab+ b (a b)= a 4ab + 6ab 4ab+ b a b= (a b)(a + b)(a+ b) (a)(a) = a (ab)= ab (a)= a Geometric formulas essential for calculating properties of shapes, areas, volumes, and angles. These formulas are crucial in geometry, helping solve problems related to triangles, circles, rectangles, and other geometric figures. We study Geometry formulas under two headings that are, 2-D Formulas 3-D Formulas Key formulas for 2D geometry, including those for calculating area, perimeter, and properties of shapes like triangles, squares, circles, and polygons ShapeFormulaSquareArea: = Perimeter: =4P=4sRectangleArea: =Perimeter: =2+2wTriangleArea: =1/2 Perimeter: =++CircleArea: =Circumference: =2ParallelogramArea: =Perimeter: =2(+)TrapezoidArea: =1/2(+) Perimeter: =+++ Essential formulas for 3D geometry, covering calculations for volume, surface area, and characteristics of three-dimensional shapes such as spheres, cubes, cylinders, cones, and prisms. ShapeFormulaCubeVolume: V=s Surface Area: =6Rectangular PrismVolume: =Surface Area: =2+2+2SphereVolume: =4/3Surface Area: =4CylinderVolume: =Lateral Surface Area: =2Total Surface Area: =2(+)ConeVolume: =1/3Lateral Surface Area: =Total Surface Area: =(+)PrismVolume: =Lateral Surface Area: =Total Surface Area: =+2PyramidVolume: =1/3Lateral Surface Area: =1/2Total Surface Area: =1/2+ Probability can simply be defined as the possibility of the occurrence of an event. It is expressed on a linear scale from 0 to 1. There are three types of probability : theoretical probability , and subjective probability. P(A) = n(A)/n(S) Where,P(A)is the Probability of an Event.n(A)is the Number of Favourable Outcomesn(S)is the Total Number of Events Formula TypeFormulaProbability of an Event()=Numberoffavorableoutcomes / Totalnumberofoutcomes Probability of the Complement of an Event()=1()Conditional Probability()=()/()Addition Rule()=()+()()Multiplication Rule (Independent Events)()=()()Multiplication Rule (Dependent Events)()=()()Bayes Theorem()={()()}/() Basic Trigonometric Formulas of Addition Formula TypeFormulaSine of Sumsin(+)=sin cos+cos sinCosine of Sumcos(+)=cos cossin sinTangent of Sumtan(+)=(tan+tan)/1tantanBasic Trigonometric Formulas of Subtraction Formula TypeFormulaSine of Differencesin()=sin coscos sinsinCosine of Differencecos()=cos cos+sin sinTangent of Differencetan()=tantan1+tan tanBasic Trigonometric Formulas of Multiplication Formula TypeFormulaDouble Angle for Sinesin2=2sincossin2=2sincosDouble Angle for Cosinecos2=cos2sin2cos2=cos2sin2Double Angle for Tangenttan2=2tan1tan2tan2=1tan22tan Trigonometric Formulas for Division Formula TypeFormulaSine Divisionsin/sinCosine Divisioncos/cosTangent Divisiontan/tan=(sin/cos)/(sin/cos)=(sin cos) / (cos sin) Cosecant Divisioncsc/csc=sin/sinSecant Divisionsec/sec=cos/cosCotangent Divisioncot/cot=(sin cos) / (sin cos) Formula TypeFormulaSine (sin)sin=opposite / hypotenuseCosine (cos)cos=adjacent / hypotenusetTangent (tan)tan=opposite / adjacentCosecant (csc)csc=1/sinSecant (sec)sec=1/cosCotangent (cot)cot=1/tanPythagorean Identitysin+=1Sine of Sumsin(+)=sin cos+cos sinCosine of Sumcos(+)=cos cossin sinTangent of Sumtan(+)=(tan+tan)/ (1tan tan)Sine of Differencesin()=sin coscos sinCosine of Differencecos()=cos cos+sin sinTangent of Differencetan()= (tantan) / (1+tan tan)Double Angle for Sinesin2=2sin cosDouble Angle for Cosinecos2=cossinDouble Angle for Tangenttan2=2tan1tan2tHalf-Angle for Sinesin/2=1cos/2Half-Angle for Cosinecos/2=1+cos/2Half-Angle for Tangenttan/2=1cos / 1+cos A fraction represents a numerical value expressed as the quotient of two integers. The top number, called the numerator, indicates how many parts of the whole are being considered, while the bottom number, the denominator, denotes the total number of equal parts that make up the whole. (a + b/c) = [(a c) + b]/c (a/b + d/b) = (a + d)/b (a/b + c/d) = (a d + b c)/(b d) a/b c/d = ac/bd (a/b)/(c/d) = a/b d/c A percentage represents a ratio or a numerical value expressed as a part of 100. It is commonly denoted by the % symbol. Percentage = (Given Value/Total Value) 100 Using math formulas efficiently requires understanding and practice. Here are some tips to help you make the most of them: Understanding: Ensure you understand the concepts behind the formula. Knowing how and why a formula works will help you apply it correctly and recognize when its applicable. Practice: Practice applying the formula to different problems. This builds familiarity and confidence, making it easier to recall and use the formula when needed. Memorization: Some formulas are fundamental and are worth committing to memory. Flashcards or repetitive practice can help with this. Visualization: Visualize what the formula represents geometrically or conceptually. This can aid in understanding and recalling the formula. Analogies: Relate new formulas to ones you already know. Drawing parallels can help you grasp new concepts faster. Context: Understand the context in which the formula is used. This helps you identify when to apply it and when alternative approaches might be more appropriate. Application: Look for opportunities to apply the formula in real-world scenarios or in solving problems. Practical application reinforces learning and understanding. Derivation: If possible, try to understand how the formula is derived. This deepens your understanding and can help you generalize the formula to different situations. Simplify: Break down complex formulas into smaller parts or terms. Understanding each component separately can make the overall formula more manageable. Review: Regularly review formulas to keep them fresh in your memory. This prevents forgetting and ensures you can recall them when needed. Resources: Use textbooks, online resources, or educational videos to supplement your learning. Different explanations or perspectives can sometimes clarify concepts. Seek Help: Dont hesitate to seek help if youre struggling with a particular formula. Teachers, tutors, or online communities can provide guidance and support. The best formula to learn math is one thats fundamental and widely applicable, such as the Pythagorean theorem, which relates to geometry and has real-world applications in areas like engineering and architecture. A simple and intuitive formula for kids is the area formula for squares and rectangles (Area = length width). Its easy to understand and apply, making it a foundational concept in early math education. The most famous formula in math is arguably Eulers identity: +1=0. It elegantly combines five fundamental mathematical constants (e, , i, 1, and 0) in a single equation, demonstrating the beauty and interconnectedness of mathematics. One of the most used formulas in math is the quadratic formula: =4 . Its vital for solving quadratic equations and has applications in various fields, including physics, engineering, and economics. The golden rule of algebra is to maintain equality by performing the same operation on both sides of an equation. This ensures that the equation remains balanced and valid, allowing for accurate mathematical manipulation and problem-solving. InstaPDF Education & Jobs Basic Maths Formulas If you are looking to download the Basic Maths Formulas PDF then you have arrived at the right place and you can directly download from the link given at the bottom of this page. Basic Maths Formulas will help the students of Class 6th to 12th to solve the Mants Equations.Math formulas PDF includes Addition, subtraction, multiplication, and division and it will help the students to solve mathematical problems easily, students should learn and remember the basic formulas based on certain fundamentals such as algebra, arithmetic, and geometry. Basic Maths Formulas List for 6th to 12th ClassPerimeterCircumferenceAreaSquareRectangleTriangleTrapezoidCircleA = a2A = l x bA = (b x h)A = ((b1+b2) x h) / 2A = x r2Surface AreaS = 6l2CSA = 2 x x r x hCSA = x r x lS = 4 x x r2VolumeV = r2hV =1/3 r2hV = 4/3 x x r3Pythagoras Theorema2+ b2= c2Distance Formulad = [(x2 x1)2+(y2 y1)2]Slope of a linem = y2 y1/ x2 x1Mid- Point FormulaM = [(x1+ x2)/ 2 , (y1+ y2)/ 2]Algebraic FormulaPythagorean theoremSlope-intercept form of the equation of a lineDistance formulaTotal costQuadratic formulaLaws of ExponentsFractional Exponentsa2+ b2= c2y = mx + cd = rttotal cost = (number of units) (price per unit)X = [-b (b2 4ac)] /2aamx bm= (a x b)m; amx an= (a)m+na1/2= aTrigonometric FormulasSine FunctionCosine FunctionTangent FunctionSin x = Opposite Side/ HypotenuseCos X = Adjacent Side/ HypotenuseTan x = Opposite Side/ Adjacent SideYou can download the Basic Maths Formulas PDF using the link given below.RELATED PDF FILESMaths Formula book PDF, includes 1300 Math formula from high school to graduations is for free download. The handbook of Mathematics formulas are very useful for students from high school to engineering and preparing for SSC and other Competitive Exams.The 1300 Math formula, written by Alex Svirin is a reference handbook for students and engineers. All Math formula from high school to undergraduate in engineering, economics, physical sciences, and mathematics. This ebook contains hundreds of formulas, tables, and figures from number Sets, Algebra, Geometry, Trigonometry, Matrices and Determinants, Vectors, Analytic Geometry, Calculus, Differential Equations, Series, and Probability Theory.The well structured table of contents, links, and layout make finding the relevant formula and information very quick. Therefore, this book is reference e-book for students. The following are the main contents of Book:-Number SetsAlgebraGeometryTrigonometryMatrices and DeterminantsVectorsAnalytic GeometryDifferential CalculusIntegral CalculusDifferential EquationsSeriesProbabilityName of Book : 1300 Math Formulas Book Author : Alex Svirin Type : E-book Language : EnglishNumber of PDF Pages : 338Quality of PDF : Very good (e-book with linked table of contents)Download the Maths Formula Book PDF from the below linkDisclaimer : We are not the owner of this Maths Formulas Book PDF. We are sharing the link for free download for the students. The PDF download link was already available on internet. Maths Formula for Class 6,7,8,9,10,11,12 & Competitive Exams Booket Sheet pdf Download: Mathematics Important formulas for CBSE, ICSE, NCERT, SCERT classes from 6th to 12th and for all Competitive Exams like CAT, IAS, RRB, IBPS, JEE, GATE, NDA, RBI, SBI and other boards. These books are also separated into Level-1, Level-2, Level-3, and Class-wise. Math formulas from algebra, trigonometry, integers, engineering formulas, polynomials, derivatives, and other important sections are divided here. Our main aim is to provide Important Formulas in Mathematics. Without Knowing Formulas, Success in the Mathematics exam is impossible. Math formulas are implemented in the textbook from Class 6 with basics and will gradually be inducted to higher classes to be tougher and more complicated. Without knowing basic formulas, one can not proceed to higher-class Formulae. So download the Complete Maths Formulae Book from the links below. PDF CBSE Class 10 Maths Formula Book Click Here PDF Gyaan Sutra Maths Formula Book for JEE Click Here (a + b) 2 = a 2 + b 2 + 2ab (a b) 2 = a 2 + b 2 2ab a 2 b 2 =(a b) (a + b) (x + a) (x + b) = x 2 + (a + b) x + ab (a + b + c) 2 = a 2 + b 2 + c 2 + 2ab + 2bc + 2ca (a + (b) + (c)) 2 = a 2 + (b) 2 + (c) 2 + 2a (b) + 2 (b) (c) + 2a (c) (a b c) 2 = a 2 + b 2 + c 2 2ab + 2bc 2ca(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 + b 2 + ab) a 3 + b 3 = (a + b) (a 2 + b 2 ab) (a + b + c) 3 = a 3 + b 3 + c 3 + 3(a + b)(b + c)(c + a) a 3 + b 3 + c 3 3abc = (a + b + c) (a 2 + b 2 + c 2 ab bc ac) If (a + b + c) = 0, a 3 + b 3 + c 3 =3abc a n b n = (a b) (a n1 + a n2 b 1 + a n3 b 2 + . + a 1 b n2 + b n1) a = a 1/2 a = a 1/3 n a = a 1/n a p. a q = a p + q a p / a q = a p q a p. b p = (ab) p (a p) q. = a pq a 0 . = 1 a n. = 1/a n Quadratic Formula: The roots of a quadratic equation ax2 + bx + c = 0 are given by x = [-b (b2 4ac)]/2a. Every competitive Exam will have a maths subject. Many think mathematics is a tricky subject. But if you know the formulae, math is a hobby. Nowadays, mathematical questions are asked in competitive exams, interviews, and private job examinations/written tests. So, basic math formulas are important at academic and career levels. Maths Formula Books for JEE Main & Advanced Join WhatsApp Group for Latest Updates Schools360 Team of Content Researchers, Writers and SEO Analysts are very passionate to Provide Genuine and Detailed information on Education, Career and Goverment Notifications. Sometimes, Math is Fun and sometimes it could be a surprising fact too. In our routine life, you can check the best route to your school, you can check where more discounted products are available in the market, and you can check which bank can offer the superior interests. This is all about calculation and connecting dots that we are able to find the solution. Mensuration Maths Formulas Formula of Square Area of Square = \(l^{2} \) Perimeter of Square = \(4 \times l \) Where, l : length of side Formula of Rectangle Area of Rectangle = \(l \times w \) Perimeter of Rectangle = \(2 (l+w) \) Where, L = Length, w = Width Formula of Circle Area of Circle = \(\pi r^{2} \) Perimeter of Circle = \(2 \pi r \) Where, = Radius, d = Diameter, d = 2 Formula of Scalene Triangle Area of Scalene Triangle = \(\sqrt{s(s-a)(s-b)(s-c)} \) Perimeter of Scalene Triangle = \(a+b+c \) Where, a, b, c are Side of Scalene Triangle Formula of Isosceles Triangle Area of Isosceles Triangle = \(\frac{1}{2}bh\) Altitude of an Isosceles Triangle = \(\sqrt{a^{2}-\frac{b^{2}}{4}}\) Perimeter of Isosceles Triangle,P = \(2a+b \) Where, b = Base, h = Height, a = length of the two equal sides Formula of Right Triangle Area of an Right Triangle = \(\frac{\sqrt{1}}{2}bh\) Perimeter of an Right Triangle = \(a+b+c\) semi Perimeter of an Right Triangle = \(\frac{a+b+c}{2}\) where, b = Base, h = Hypotenuse, a = Hight Formula of Equilateral Triangle Area of an Equilateral Triangle = \(\frac{\sqrt{3}}{4}a^{2}\) Perimeter of an Equilateral Triangle = \(3a\) Semi Perimeter of an Equilateral Triangle = \(\frac{3a}{2}\) Height of an Equilateral Triangle = \(\frac{\sqrt{3}}{2}a\) Where, a = side, h = altitude Formula of Rhombus Perimeter of a rhombus = \(4\times Side\) Area of a Rhombus A = \(\frac{1}{2} \times d_{1} \times d_{2} \) Where, d1 and d2 are the diagonals Formula of Parallelogram Area of a Parallelogram = \(b\times h\) Perimeter of Parallelogram = \(2\left(b+h\right)\) Where, b: Base, h: Height. Formula of Trapezoid Perimeter of a Trapezoid = \(a+b+c+d\) Area of a Trapezoid = \(\frac{1}{2} \times h \times (a + b)\) Where: h = height, a = the short base, b = the long base, c, d are the lengths of side. Formula of Cube Surface area of Cube = \(6a^{2}\) Volume of a cube = \(a^{3}\) Where, a is the side length of the cube. Formula of Cuboid Surface area of Cuboid = \(2(lb + bh + hl)\) Volume of a Cuboid = \(h \times l \times w\) Where, l: Height, h: Legth, w: Depth Formula of Circle Diameter of a sphere = \(2r\) Circumference of a sphere = \(2\pi r\) Surface area of a sphere = \(4\pi r^{2}\) Volume of a sphere = \(\frac{4}{3}\: \pi r^{3}\) Where, r: Radius Formula of Hemisphere Curved Surface area of a Hemisphere = \(3\pi r^{2}\) Total Surface area of a Hemisphere = \(\frac{2}{3}\: \pi r^{3}\) Volume of a Hemisphere = \(\frac{2}{3}\: \pi r^{3}\) Where, r: Radius Formula of Cylinder Curved Surface area of a Cylinder = \(2\pi rh\) Total Surface area of a Cylinder = \(2\pi r(r+h)\) Volume of a Cylinder = \(\pi r^{2} h\) Where, r: Radius, h: Height Formula of cone Total Surface Area of cone = \(\pi r \left (s+r \right)\) Vomule of cone = \(\frac {1}{3}\pi r^{2}h\) Curved Surface Area of cone = \(\pi rs\) Where, r = radius, h = height, s = slant height Trigonometry Maths Formulas \(\sin \theta = \frac{Opposite}{Hypotenuse}\) \(\sec \theta = \frac{Hypotenuse}{Adjacent}\) \(\cos\theta = \frac{Adjacent}{Hypotenuse}\) \(\tan \theta =\frac{Opposite}{Adjacent}\) \(\csc \theta = \frac{Hypotenuse}{Opposite}\) \(\cot \theta = \frac{Adjacent}{Opposite}\) The Reciprocal Identities are given as: \(\cosec\theta =\frac{1}{\sin\theta }\) \(\sec\theta =\frac{1}{\cos\theta }\) \(\cot\theta =\frac{1}{\tan\theta }\) \(\sin\theta =\frac{1}{\csc\theta }\) \(\cos\theta =\frac{1}{\sec\theta }\) \(\tan\theta =\frac{1}{\cot\theta }\) Trigonometric Values of Special Angles Degreesincostancotseccosec0010Not Defined1Not Defined30\[\frac{1}{2}\]\[\frac{3}{2}\]\[\frac{1}{3}\]3\[\frac{2}{3}\]245\[\frac{1}{2}\]\[\frac{1}{2}\]112260\[\frac{3}{2}\]\[\frac{1}{2}\]3\[\frac{1}{3}\]2\[\frac{2}{3}\]9010Not Defined0Not Defined1 Product: \(\sin\: x\cdot \cos\:y=\frac{\sin(x+y)+\sin(x-y)}{2}\) \(\cos\: x\cdot \cos\:y=\frac{\cos(x+y)+\cos(x-y)}{2}\) \(\sin\: x\cdot \sin\:y=\frac{\cos(x+y)-\cos(x-y)}{2}\) Sum to Product: \(\sin\: x+\sin\: y=2\sin\frac{x+y}{2}\cos\frac{x-y}{2}\) \(\sin\: x-\sin\: y=2\cos\frac{x+y}{2}\sin\frac{x-y}{2}\) \(\cos\: x+\cos\: y=2\cos\frac{x+y}{2}\cos\frac{x-y}{2}\) \(\cos\: x-\cos\: y=-2\sin\frac{x+y}{2}\sin\frac{x-y}{2}\)< Pythagorean Sin2x + Cos2x = 1 1 + tan2x = sec2x 1 + cot2x = cosec2x Pythagorean in Radical Form sinx = \cos2x tanx = sec2x-1 cosx = 1sin2x Odd-Even Sin(-x)=-sin x cos(-x)=-cos x tan(-x)=-tan x cot(-x)=-cot x sec(-x)=-sec x cosec(-x)=-cosec x Ratio or Quotient Identities are given as: \(Sin = Cos \times Tan \) \(Cos = Sin \times Cot \) \(Tan = \frac{Sin}{Cos} \) \(Cot = \frac{Cos}{Sin} \) Periodicity \(sin(x+2\pi)=sin\; x\) \(cos(x+2\pi)=cos\; x\) \(tan(x+\pi)=tan\; x\) \(cot(x+\pi)=cot\; x\) Co-function: \(sin(90^{\circ}-x)=cos\; x\) \(cos(90^{\circ}-x)=sin\; x\) \(tan(90^{\circ}-x)=cot\; x\) \(cot(90^{\circ}-x)=tan\; x\) Sum/Difference: \(\sin (x + y) = \sin(x) \cos(y) + \cos(x) \sin(y)\) \(\cos(x + y) = \cos(x) \cos(y) \sin(x) \sin(y)\) \(\tan(x+y)=\frac{\tan\: x+\tan\: y}{1-\tan\: x\cdot \tan\: y}\) \(\sin (x y) = \sin(x) \cos(y) \cos(x) \sin(y)\) \(\cos (x y) = \cos(x) \cos(y) + \sin(x) \sin(y)\) \(\tan(x-y)=\frac{\tan\: x \tan\: y}{1+\tan\: x\cdot \tan\: y}\) Double Angle: \(\sin(2x) = 2\sin(x).\cos(x)\) \(\cos(2x) = \cos^{2}(x) \sin^{2}(x)\) \(\cos(2x) = 2 \cos^{2}(x) -1\) \(\cos(2x) = 1 2 \sin^{2}(x)\) \(\tan(2x) = \frac{[2\: \tan(x)]}{[1 -\tan^{2}(x)]}\) Half Angle: \(\sin\frac{x}{2}=\pm \sqrt{\frac{1-\cos\: x}{2}}\) \(\cos\frac{x}{2}=\pm \sqrt{\frac{1+\cos\: x}{2}}\) \(\tan(\frac{x}{2}) = \sqrt{\frac{1-\cos(x)}{1+\cos(x)}}\) Albegra Maths Formulas (a + b)2=a2 + 2ab + b2 (ab)2=a22ab + b2 (a + b)(a b)=a2 b2 (x + a)(x + b)=x2 + (a + b)x + ab (x + a)(x b)=x2 + (a b)x ab (x a)(x b)=x2 + (b a)x ab (x a)(x b)=x2 (a + b)x + ab (a + b)3=a3 + b3 + 3ab(a + b) (a b)3=a3 b3 3ab(a b) (x + y + z)2=x2 + y2 + z2 + 2xy + 2yz + 2xz (x + y z)2=x2 + y2 + z2 2xy 2yz + 2xz (x y z)2=x2 + y2 + z2 2xy + 2yz 2xz x3 + y3 + z3 3xyz=(x + y + z)(x2 + y2 + z2 xy yzxz) (x + a)(x + b)(x + c)=x3 + (a + b + c)x2 + (ab + bc + ca)x + abc x3 + y3=(x + y)(x2 xy + y2) x3 y3=(x y)(x2 + xy + y2) (a + b)4 = a4 + 4a3b + 6a2b2 + 4ab3 + b4) (a b)4 = a4 4a3b + 6a2b2 4ab3 + b4) a4 b4 = (a b)(a + b)(a2 + b2) a5 b5 = (a b)(a4 + a3b + a2b2 + ab3 + b4) If n is even (n = 2k), an + bn = (a + b)(an-1 an-2b ++ bn-2a bn-1) If n is odd (n = 2k + 1), an + bn = (a + b)(an-1 an-2b +- bn-2a bn-1) If n is odd (n = 2k + 1), an - bn = (a - b)(an-1 an-2b + bn-2a + bn-1) (a + b + c)2 = a2 + b2 + c2 + 2(ab + ac + bc + . Laws of Exponents(am)(an) = am+n(ab)m = ambm(am)n = amn Fractional Exponentsa0 = 1aman=amnaman=amnamam = 1am1amamam = 1am \(x^{2} + y^{2} = \frac{1}{2} \left [(x + y)^{2} + (x y)^{2} \right]\) \(x^{2} + y^{2} + z^{2} -xy yz zx = \frac{1}{2} [(x-y)^{2} + (y-z)^{2} + (z-x)^{2}]\) \(\mathbf{a_{1}x + b_{1}y + c_{1} = 0}\) \(\mathbf{a_{2}x+ b_{2}y + c_{2}} = 0 \) Distributive Property a (b+c) = (a b) + (a c) Commutative Property of Addition a + b = b+a Commutative Property of Multiplication a b = ba Associative Property of Addition a + (b + c) = (a+ b) +c Associative Property of Multiplication a (b c) = (a b) c Additive Identity Property a +0 = a Multiplicative Identity Property a1 = a Additive Inverse Property a+ (-a) = 0 Multiplicative Inverse Property a 1/a = 1 Zero Property of Multiplication a 0 = 0 If\(\vec{a}=x\hat{i}+y\hat{j}+z\hat{k}\) then magnitude or length or norm or absolute value of \(\vec{a} \) is \(\left | \overrightarrow{a} \right |=a=\sqrt{x^{2}+y^{2}+z^{2}}\) A vector of unit magnitude is unit vector. If \(\vec{a}\) is a vector then unit vector of \(\vec{a}\) is denoted by \(\hat{a}\) and \(\hat{a}=\frac{\hat{a}}{\left | \hat{a} \right |}\) Therefore \(\hat{a}=\frac{\hat{a}}{\left | \hat{a} \right |}\hat{a}\) Important unit vectors are \(\hat{i}, \hat{j}, \hat{k}\), where \(\hat{i} = [1,0,0],\: \hat{j} = [0,1,0],\: \hat{k} = [0,0,1]\) If \(l=\cos \alpha, m=\cos \beta, n=\cos\gamma,\) then \(\alpha, \beta, \gamma,\) are called directional angles of the vectors\(\overrightarrow{a}\) and \(\cos^{2}\alpha + \cos^{2}\beta + \cos^{2}\gamma = 1\) \(\vec{a}+\vec{b}=\vec{b}+\vec{a}\) \(\vec{a}+\left (\vec{b}+ \vec{c} \right)=\left (\vec{a}+ \vec{b} \right)+\vec{c}\) \(k\left (\vec{a}+\vec{b} \right)=k\vec{a}+k\vec{b}\) \(\vec{a}+\vec{0}=\vec{0}+\vec{a}\), therefore \(\vec{0}\) is the additive identity in vector addition. \(\vec{a}+\left (-\vec{a} \right)=-\vec{a}+\vec{a}=\vec{0}\), therefore \(\vec{a}\) is the inverse in vector addition. Probability and Set Theory Maths Formulas Commutative= \(A\cup B = B\cup A \) and \(A\cap B = B\cap A \) Associative= \(A\cup (B\cup C) = A\cup (B\cup C) \) and \(A\cap (B\cap C) = A\cap (B\cap C) \) Neutral element= \(A\cup \theta = A \) and \(A\cap E = A \) Absorbing element= \(A\cup E = E \) and \(A\cap \theta = \theta \) Distributive= \(A\cup (B\cap C)=(A\cup B)\cap (A\cup C) \) and \(A\cap (B\cup C)=(A\cap B)\cup (A\cap C) \) De Morgans laws= \(\bar{A\cap B} = \bar A \cup \bar B \) and \(\bar{A\cup B} = \bar A \cap \bar B \) Independent Events= \(P(A | B)=P(A) \) and \(P(A\cap B)=P(A)P(B)\) Conditional Probability= \(P(A | B)=\frac{P(A\cap B)}{P(B)} \) Laplace laws= \(P(A)=\frac{Number\;of\;ways\;it\;can\;happen}{Total\;Number\;of\;Outcomes} \) Complement of an Event= \(P (\bar A)=1 P(A)\) Union of Events= \(P(A\cup B)=P(A)+P(B)P(A\cap B)\) Statistics Maths Formulas \(Direct\; Method: x = \frac{\sum_{i=1}^{n}f_i x_i}{\sum_{i=1}^{n}f_i}\) where fi xi is the sum of observations from value i = 1 to n And fi is the number of observations from value i = 1 to n \(Assumed\; mean\; method : x = a+\frac{\sum_{i=1}^{n}f_i d_i}{\sum_{i=1}^{n}f_i}\) \(Step \;deviation \;method : x = a+\frac{\sum_{i=1}^{n}f_i u_i}{\sum_{i=1}^{n}f_i}\times h\) \(Mode = l+\frac{f_1 f_0}{2f_1 f_0 f_2}\times h\) \(Range = Largest\; Value Smallest\; Value \) \(Median = l+\frac{\frac{n}{2} cf}{f} \times h\) \(Variance = \sigma ^{2} = \frac{\sum (x- \bar{x})^{2}}{n}\)Where, x = Items given, x = Mean, n = Total number of items \(Standard\;Deviation \; \sigma = \sqrt{\frac{\sum (x-\bar{x})^{2}}{n}}\) Where, x = Items given, x = Mean, n = Total number of items Power zero = \(a^{ 0 } = 1\) Power one = \(a^{ 1 } = a\) Fraction formula = \(\sqrt{ a } = a^{ \frac{ 1 }{ 2 }}\) Reverse formula = \(\sqrt{ n } { a } = a^{\frac{ 1 } { n }}\) Negative power value = \(a^{ -n } = \frac{ 1 }{ a^{n} }\) Fraction formula = \(a^{n} = \frac{1}{ a^{ -n } }\) Product formula = \(a^{m}a^{n} = a^{ m + n }\) Division Formula = \(\frac{ a^{ m }}{ a^{ n }} = a ^{ m-n }\) Power of Power formula = \((a^{ m })^{ p } = a^{ mp }\) Power distribution Formula = \((a^ { m }c^{ n })^{ x } = a ^ { mx } c ^{ nx }\) The Power distribution Formula = \(\left (\frac {a ^ { m }}{c^{ n }} \right)^{x} = \frac{a^{ mx }}{c^{ nx }}\) Power Even Number = \((-1)^{Even Number} = 1 \) Power Odd Number = \((-1)^{Odd Number} = -1 \) Product of Power Formula = \((ab)^m = a^m \times b^m \) Complex number = \(z=a+bi \) Conjugate = \(\bar z =abi \) Symmetry = \(z=abi \) Equality = a+bi=c+dia=c and b=d Addition = \((a+bi)+(c+di)=(a+c)+(b+d)i \) Subtraction = \((a+bi)(c+di)=(ac)+(bd)i \) Multiplication = \((a+bi)\times(c+di)=(acbd)+(ad+bc)i \) Division = \(\frac{(a+bi)}{(c+di)} = \frac{a+bi}{c+di} \times \frac{c-di}{c-di} = \frac{ac+bd}{c^{2}+d^{2}} + \frac{bc-ad}{c^{2}+d^{2}}i \) Multiplication Conjugates = \((a+bi)(a+bi)=a^{2}+b^{2} \) Powers of Complex Numbers in i = i, if n = 4a+1, i.e. one more than the multiple of 4. Example i1=i; i5=i; i9=i; i4a+1; in = -1, if n = 4a+2, i.e. two more than the multiple of 4. Example i2= -1; i6= -1; i10= -1; i4a+2; in = -i, if n = 4a+3, i.e. Three more than the multiple of 4. Example i3= -i; i7= -i; i11= -i; i4a+3; in = -1, if n = 4a, i.e. the multiple of 4. Example i4= 1; i8= 1; i12= 1; i4a; Logic Maths Formulas ConjunctionDisjunctionImplication pqp qpqpqpqp q VVVVVVVVV VFFVFVVFF FVFFVVFVV FFFFFFFFV Law of noncontradiction p~pF Law of the excluded middle p~pV Double Negation ~(~p)p Commutativity Conjunction pqqp Disjunction pqqp Associativity Conjunction (pq)rp(qr) Disjunction (pq)rp(qr) Neutral Element Conjunction pVp Disjunction pFp Absorbing Element Conjunction pFF Disjunction pVV Idempotence Conjunction ppp Distributive Property Conjunction over Disjunction p(qr)(pq)(pr) Disjunction over Conjunction p(qr)(pq)(pr) Properties of Implication Transitive (pq)(qr)(pr) Implication and Disjunction (pq)~pq Negation ~(pq)p~q Contrapositive of an Implication (pq)(~q~p) Properties of Equivalence Double implication (pq)[(pq)(qp)] Transitive [(pq)(qr)](pr) Negation ~(pq)[(p~q)(q~p)] De Morgans laws Negation of a Conjunction ~(pq)~p~q Negation of a Disjunction ~(pq)~p~q De Morgans laws Negation of Universal Quantifier ~(x,p(x))x:~p(x) Negation of Existential Quantifier ~(x:p(x))x,~p(x) Limits Maths Formulas 1) If \(\lim_{x \to a} f(x) = l\; and \; \lim_{x \to a} g(x) = m\), then \(\lim_{x \to a} \left[{f(x) \pm g(x)} \right] = l \pm m\) \(\lim_{x \to a} f(x) \cdot g(x) = l \cdot m\) \(\lim_{x \to a} \frac{{f(x)}}{{g(x)}} = \frac{l}{m}\), where \(m e 0\) \(\lim_{x \to a} c{\text{ }}f(x) = c{\text{ }}\lim_{x \to a} \frac{1}{{f(x)}} = \frac{1}{l}\), where \(l e 0\) 2) \(\lim_{n \to \infty } {\left({1 + \frac{1}{n}} \right)^n} = e\), where \(n\) is a real number. 3) \(\lim_{n \to 0} {\left({1 + n} \right)^{\frac{1}{n}}} = e\), where \(n\) is a real number. 4) \(\lim_{x \to 0} \frac{{Sinx}}{x} = 1\), where \(x\) is measured in radians. 5) \(\lim_{x \to 0} \frac{{Tanx}}{x} = 1\) 6) \(\lim_{x \to 0} \frac{{Cosx 1}}{x} = 0\) 7) \(\lim_{x \to a} \frac{{{x^n} {a^n}}}{{x a}} = n{a^{n 1}}\) 8) \(\lim_{x \to 0} \frac{{{a^n} 1}}{x} = \ln a\) Logarithms Maths Formulas Properties \(\log_{b}1 = 0\) (b^0 = 1) \(\log_{b}b = 1\) (b1 = b) \(y = \ln x \quad \Rightarrow e^y = x\) \(x = e^y \quad \Rightarrow \ln x = y\) \(x = \ln e^x = e^{\ln x}\) \(b^{\log_{b}x} = x\) \(\log_{b}{b^y} = y\) Laws of Logarithms 1. \(\log_{b}{M \times N} = \log_b{M} + \log_b{N}\) (where b, M, N are positive real numbers and b 1) 2. \(\log_{b}\frac{M}{N} = \log_b{M} \log_b{N}\)(where b, M, N are positive real numbers and b 1) 3. \(\log_{b}M^c = c \ \log_b{M}\) (where b and M are positive real numbers , b 1, c is any real number) 4. \(\log_{b}M = \frac{\log_{M}}{\log b} = \frac{\ln {M}}{\ln b} = \frac{\log_{k} {M}}{\log_{k} b}\) (where b, k and M are positive real numbers, b 1, k 1) 5. \(\log_{b}a = \frac{1}{\log_{a}b}\) (where a and b are positive real numbers, a 1, b 1) 6. If \(\log_{b}{M}=\log_{b}{N}\), then M = N (where b, M and N are positive real numbers and b 1). Related Math Formulas Learning Math is not easy and this is the reason why we have discovered unique ways to amplify your learning. We have given easy definitions and formulas of different mathematical concepts so that you can learn them at your fingertips quickly. Also, we have hosted a large sheet of formulas for your reference so that you can memorize them and apply them wherever needed. Download 1300 Maths Formulas PDF You just have to click on the topic and get all relevant details and formulas with simple navigation. Also, we have discussed the applications of the different mathematical concepts in real life and how it can help students in their careers. Well, formulas can be simpler or complex based on the topic you selected but there is a need for depth understanding of each of the formulas to solve a particular problem. 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