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Concepts covered in GST (Goods And Service Tax) are Basic Concepts of Profit and Loss, Basic/Cost Price Including Inverse Cases., Computation of Tax, Concept of Discount, Dealer, GST (Goods and Service Tax), Gst Tax Calculation, Input Tax Credit (Itc), List Price, Sales Tax, Value Added Tax, and Good and Services Tax, Selling Price.ExerciseNo. of questionsPagesExercise 1 (A)148 to 9Exercise 1 (B)1617 to 18Concepts covered in Banking (Recurring Deposit Account) are Banking, Computation of Interest, Money and Banking in Arithmetic.ExerciseNo. of questionsPagesExercise 2 (A)1223 to 24Exercise 2 (B)1124Concepts covered in Linear Inequations (In one variable) are Linear Inequations in One Variable, Representation of Solution on the Number Line, Solving Algebraically and Writing the Solution in Set Notation Form.ExerciseNo. of questionsPagesExercise 4 (A)2944Exercise 4 (B)6049 to 50Concepts covered in Solving (simple) Problems (Based on Quadratic Equations) are Miscellaneous Problems, Problems Based on Distance, Speed and Time, Problems Based on Geometrical Figures, Problems Based on Numbers, Problems Based on Time and Work, Problems on C.P. and S.P..Concepts covered in Ratio and Proportion (Including Properties and Uses) are Alternendo and Invertendo Properties, Componendo and Dividendo Properties, Concept of Proportion, Concept of Ratio, Direct Applications.Concepts covered in Remainder and Factor Theorems are Factorising a Polynomial Completely After Obtaining One Factor by Factor Theorem, Factor Theorem, Remainder Theorem.Concepts covered in Matrices are Addition and Subtraction of Matrices, Introduction of Matrices, Matrices Examples, Multiplication of Matrix, Types of Matrices.Concepts covered in Geometric Progression are Geometric Progression - Finding Sum of Their First N Terms, Geometric Progression - Finding Their General Term., Simple Applications - Geometric Progression.Concepts covered in Reflection are Invariant Points., Reflection Concept, Reflection Examples, Reflection of a Point in a Line, Reflection of a Point in the Origin..Concepts covered in Section and Mid-Point Formula are Centroid of a Triangle, Co-ordinates Expressed as (x,y), Distance Formula, Points of Trisection, Section Formula, The Mid-point of a Line Segment (Mid-point Formula).Concepts covered in Equation of a Line are Collinearity of Three Points, Concept of Slope, Conditions for Two Lines to Be Parallel Or Perpendicular, Equation of a Line, General Equation of a Line, Geometric Understanding of c as the y-intercept Or the Ordinate of the Point Where the Line Intercepts the y Axis Or the Point on the Line Where x=0, Geometric Understanding of m as Slope Or Gradient Or tan Where Is the Angle the Line Makes with the Positive Direction of the x Axis, Simple Applications of All Co-ordinate Geometry., Slope Intercept Form, Slope of a Line, Two - Point Form, Various Forms of Straight Lines.Concepts covered in Similarity (With Applications to Maps and Models) are Areas of Similar Triangles Are Proportional to the Squares on Corresponding Sides, Axioms of Similarity of Triangles, Basic Proportionality Theorem with Applications, Conditions for Similarity of Two Triangles: (Sas, Aa Or Aaa and Sss), Direct Applications Based on the Above Including Applications to Maps and Models, Relation Between the Areas of Two Triangles, Similarity as a Size Transformation, Similarity of Triangles.Concepts covered in Loci (Locus and Its Constructions) are Constructions Under Loci, Introduction of Loci, Loci Examples, Theorems Based on Loci.Concepts covered in Circles are Arc and Chord Properties - Angle in a Semi-circle is a Right Angle, Arc and Chord Properties - If Two Arcs Subtend Equal Angles at the Center, They Are Equal, and Its Converse, Arc and Chord Properties - If Two Chords Are Equal, They Cut off Equal Arcs, and Its Converse (Without Proof), Arc and Chord Properties - If Two Chords Intersect Internally Or Externally Then the Product of the Lengths of the Segments Are Equal, Arc and Chord Properties - the Angle that an Arc of a Circle Subtends at the Center is Double that Which It Subtends at Any Point on the Remaining Part of the Circle, Areas of Sector and Segment of a Circle, Chord Properties - a Straight Line Drawn from the Center of a Circle to Bisect a Chord Which is Not a Diameter is at Right Angles to the Chord, Chord Properties - the Perpendicular to a Chord from the Center Bisects the Chord (Without Proof), Chord Properties - There is One and Only One Circle that Passes Through Three Given Points Not in a Straight Line, Concept of Circle, Cyclic Properties, Number of Tangents from a Point on a Circle, Tangent Properties - If a Chord and a Tangent Intersect Externally, Then the Product of the Lengths of Segments of the Chord is Equal to the Square of the Length of the Tangent from the Point of Contact to the Point of Intersection, Tangent Properties - If a Line Touches a Circle and from the Point of Contact, a Chord is Drawn, the Angles Between the Tangent and the Chord Are Respectively Equal to the Angles in the Corresponding Alternate Segments, Tangent Properties - If Two Circles Touch, the Point of Contact Lies on the Straight Line Joining Their Centers, Tangent to a Circle, Theorem: Angles in the Same Segment of a Circle Are Equal., Theorem: Equal chords of a circle are equidistant from the centre., Theorem : The Chords of a Circle Which Are Equidistant from the Centre Are Equal..Concepts covered in Tangents and Intersecting Chords are Arc and Chord Properties - Angle in a Semi-circle is a Right Angle, Arc and Chord Properties - If Two Arcs Subtend Equal Angles at the Center, They Are Equal, and Its Converse, Arc and Chord Properties - If Two Chords Are Equal, They Cut off Equal Arcs, and Its Converse (Without Proof), Arc and Chord Properties - If Two Chords Intersect Internally Or Externally Then the Product of the Lengths of the Segments Are Equal, Arc and Chord Properties - the Angle that an Arc of a Circle Subtends at the Center is Double that Which It Subtends at Any Point on the Remaining Part of the Circle, Areas of Sector and Segment of a Circle, Chord Properties - a Straight Line Drawn from the Center of a Circle to Bisect a Chord Which is Not a Diameter is at Right Angles to the Chord, Chord Properties - the Perpendicular to a Chord from the Center Bisects the Chord (Without Proof), Chord Properties - There is One and Only One Circle that Passes Through Three Given Points Not in a Straight Line, Concept of Circle, Cyclic Properties, Number of Tangents from a Point on a Circle, Tangent Properties - If a Chord and a Tangent Intersect Externally, Then the Product of the Lengths of Segments of the Chord is Equal to the Square of the Length of the Tangent from the Point of Contact to the Point of Intersection, Tangent Properties - If a Line Touches a Circle and from the Point of Contact, a Chord is Drawn, the Angles Between the Tangent and the Chord Are Respectively Equal to the Angles in the Corresponding Alternate Segments, Tangent Properties - If Two Circles Touch, the Point of Contact Lies on the Straight Line Joining Their Centers, Tangent to a Circle, Theorem: Angles in the Same Segment of a Circle Are Equal., Theorem: Equal chords of a circle are equidistant from the centre., Theorem : The Chords of a Circle Which Are Equidistant from the Centre Are Equal..Concepts covered in Constructions (Circles) are Circumference of a Circle, Circumscribing and Inscribing a Circle on a Regular Hexagon, Circumscribing and Inscribing a Circle on a Triangle, Circumscribing and Inscribing Circle on a Quadrilateral, Construction of Tangents to a Circle.ExerciseNo. of questionsPagesExercise 1928292 to 293Concepts covered in Trigonometrical Identities are Heights and Distances - Solving 2-D Problems Involving Angles of Elevation and Depression Using Trigonometric Tables, Trigonometric Identities, Trigonometric Ratios of Complementary Angles, Trigonometry.Concepts covered in Height and Distances are Heights and Distances - Solving 2-D Problems Involving Angles of Elevation and Depression Using Trigonometric Tables, Trigonometric Identities, Trigonometric Ratios of Complementary Angles, Trigonometry.Concepts covered in Graphical Representation are Calculation of Lower, Upper, Inter, Semi-Inter Quartile Range, Concept of Median, Concepts of Statistics, Finding the Median, upper quartile, lower quartile from the Ogive, Finding the Mode from the Histogram, Finding the Mode from the Lower Quartile, Finding the Mode from the Upper Quartile, Graphical Representation of Data as Histograms, Graphical Representation of Ogives, Mean of Continuous Distribution, Mean of Grouped Data, Mean of Ungrouped Data, Median of Grouped Data, Median of Ungrouped Data, Mode of Grouped Data, Mode of Ungrouped Data, Ogives (Cumulative Frequency Graphs).ExerciseNo. of questionsPagesExercise 2315348 to 349Concepts covered in Measure of Central Tendency (Mean, Median, Quartiles and Mode) are Calculation of Lower, Upper, Inter, Semi-Inter Quartile Range, Concept of Median, Concepts of Statistics, Finding the Median, upper quartile, lower quartile from the Ogive, Finding the Mode from the Histogram, Finding the Mode from the Lower Quartile, Finding the Mode from the Upper Quartile, Graphical Representation of Data as Histograms, Graphical Representation of Ogives, Mean of Continuous Distribution, Mean of Grouped Data, Mean of Ungrouped Data, Median of Grouped Data, Median of Ungrouped Data, Mode of Grouped Data, Mode of Ungrouped Data, Ogives (Cumulative Frequency Graphs).Concepts covered in Probability are Basic Ideas of Probability, Measurement of Probability, Probability - A Theoretical Approach, Random Experiments, Sample Space, Simple Problems on Single Events, Type of Event - Complementry. 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You must check it out for yourself; the experience can be impressive. You get to prepare for the exam reliably, comprehensively, and thoroughly.Please look at our Maths ICSE Class 10 CISCE answer guide today if you'd like to handle this exam efficiently. Just browse our solutions right now, and you will master the Selina exam questions in no time! It will offer an extraordinary experience every time, and you will not have to worry about any issues. Are you looking for Mathematics Formulas ICSE Class 10, then you have come to the correct place. On this page, we have provided Class 10 Mathematics Chapter-wise formulas for all important topics which are covered in your Mathematics books. You can use these formula banks for ICSE for revision just prior to your exams or for daily use too. Its important for you to remember these formulas they will be really useful when you solve mathematics problems. ICSE MATHEMATICS (X) The paper will be divided into two Sections. Section I (40 marks), Section II (40 marks). Section I: It will consist of compulsory short answer questions. Section II: Candidates will be required to answer four out of seven questions. UNITS & CHAPTERS 1. COMMERCIAL ARITHMETIC Compound Interest (Paying back in equal installments not included) Sales Tax and Value Added Tax Banking (Saving Bank Accounts and Recurring Deposit Accounts) Shares and Dividends (Brokerage and fractional shares not included) 2. ALGEBRA Linear Inequations Quadratic Equations and Solving Problems Ratio and Proportion Remainder and Factor Theorems (f(x) not to exceed degree 3) Matrices 3. CO-ORDINATE GEOMETRY Reflection Distance and Section Formulae Equation of a Straight Line 4. GEOMETRY Symmetry Similarity Loci (Locus and Its Constructions) Circles Tangents and Intersecting Chords Constructions (tangents to circle, circumscribing & inscribing circle on & reg. hexagon) 5. MENSURATION Circumference and Area of a circle (Area of sectors of circles other than semi-circle and quarter-circle not included) Surface Area and Volume (of solids) 6. TRIGONOMETRY Trigonometrical Identities and Trigonometrical Tables Heights and Distances (Cases involving more than 2 right angled excluded) 7. STATISTICS Graphical Representation (Histogram and Ogives) Measures of Central Tendency (Mean, Median, Quartiles and Mode) Probability Commercial Arithmetic a) Goods and Service Tax [GST] What is GSTGST is a comprehensive tax levy on manufacture, sale and consumption of goods and service at a national level under which no distinction is made between goods and services for levying of tax. It substitutes all the indirect taxes levied on goods and services by the Central and State government in India. GST is a tax on goods and services under which every person is liable to pay tax on his output and is entitled to get Input Tax Credit, (ITC) on the tax paid on its inputs and ultimately the final consumer shall bear the tax. Objective of GST One of the main objective of GST is to eliminate the double taxation on production anddistribution cost of goods and services. The exclusion of cascading effects, that is, tax on tax till the level of final consumers will significantly improve the competitiveness of original goods andservices in market which will have a beneficial impact on the GDP of the country. Worldwide GST France was the first country to introduce GST in 1954. GST rates of seven countries are mentioned below: GST Computation Applicable GST rates in India are 5%, 12%, 18% or 28%. Say, goods are sold at the rate of Rs.500. GST rate is 18%. Then Gross amount of the goods is= 500 + [500 (18/100)] = Rs.590. Types of Problems Included in syllabus i) Computation of tax including discounts ii) List-price iii) Profit and Loss iv) Basic / Cost Price including inverse cases Formulae Add GSTGST Amount = Original Cost GST % / 100Net Price = Original Cost + GST Amount Remove GST GST Amount = Original Cost [Original Cost (100 / 100+GST)]Net Price = Original Cost GST Amount b) Banking Types of accountsi) SB = Savings accounts in which simple interest is offered.ii) FD = Fixed Deposit, that is, a sum of money is deposited for a fixed period, and so more rate of interest is offered.iii) RD = Recurring Deposit, that is, certain fixed sum is deposited every month, and interest rate offered is usually more than SB, but less than FD. Formulae 1. For SB account simple interest (SI) is offered.SI = P x R x T / 100where P = Principal amount, R = rate of interest, T = Time. For Recurring Deposit Account Matured Amount = Total sum deposit + Interest on it where P = Each Installment, r = rate per annum, n = number of months (The sum of Natural Numbers: S = 1 + 2 + 3 + + N = N(N+1) /2) MV = P(n) + I, Where MV = Matured Value, P(n) = Total Sum Deposited, I = Interest c) Shares and Dividends Nominal Value = Face Value = Par Value = FV Market Value = MV Dividend = Income Types of Problems Included in syllabus i) Computation of MV/FV ii) Market value iii) Dividend iv) Rate of Dividend v) Premium Formulae 1. Income = No. of Shares Rate of Dividend FV 2.No. of Shares = Total Nominal Value / Nominal Value per shares or Investment / Market Value of each share 3. Investment = No. of Shares X MV per share 4. Total Nominal Value= No. of Shares X FV per shares 5. Dividend (Income) = NV/MV Investment Dividend% 6. Sales proceeds = No. of Shares X Selling Price of Each Share 7. Rate of Dividend = Profit % or Yield % or Return% = Income / Investment x 100 8. Earning = NV/MV Investment Rate of Dividend 9. For better investment, compare the Yield% of both shares 10. Discount Shares means Market Value < Face value 11. Premium Share means Market Value > Face Value 12. Share at par means Market Value = Face Value Compound Interest: A = P + I S.I. for 1st year = C.I. for 1st year Sales Tax and Value Added Tax: The price at which an Article is marked : List Price/Marked Price/Printed Price/Quoted Price Sale Price = M.P. Discount, Discount is calculated on M.P. Sales Tax is calculated after deducting the discount (on the discounted price). VAT = Tax recovered(charged) on the sale Tax paid on the purchase Banking: 1. SB Account:a. Withdrawal = Debitb. Deposit = Creditc. Steps for calculation of interest: i. Find the minimum balance of each month between 10th day and the last day.ii. Add all the balances. This is the Equivalent Monthly Principal for 1 month.iii. Calculate the SI on the Equivalent Monthly Principal with T = 1/12 years.iv. No interest is paid for the month in which the account is closed.v. If the Amount Received on closing is asked, add the interest to the LAST BALANCE and not to the Equivalent Monthly Principal. 2. RD Account: Shares and Dividend: The total money invested by the company is called its capital stock. The capital stock is divided into a number of equal units. Each unit is a called a share. Nominal Value is also called Register Value, Printed Value, and Face Value. The FV of a share always remains the same, while its MV goes on changing. The part of the profit of a company which is distributed amongst the shareholders is known as dividend. If the MV of the share is same as its NV, the share is said to be at par. If the MV of the share is greater than NV, the share is said to be at premium. If the MV of the share is less than NV, the share is said to be at discount Algebra a) Linear InequationsLinear Inequation is one unknown variable for x N, W, Z and R.i) Natural numbers (N) = {1, 2, 3, 4, 5, }ii) Whole numbers (W) = {0, 1, 2, 3, 4, 5, } (W0N)iii) Integers (I, Z) = {-, -3, -2, -1, 0, 1, 2, 3, 4, 5, }iv) Real numbers (R) = {-, .0 } (all decimals and fractions in between are included) Types of Problems Included in syllabusi) Solving algebraically and writing the solution in set notation formii) Representation of solution on the number line Inequation signsi) The sign < means is less than.ii) The sign > means is greater than.iii) The sign means is less or equal to.iv) The sign means is less or equal to. Rulesi) By adding equal number to both sides of an inequation, sign remains unchanged.ii) By subtracting equal number from both sides of an inequation, sign remains unchanged.iii) Multiplying by a positive equal number to both sides of an inequation, sign remainsunchanged.iv) Dividing by a positive equal number to both sides of an inequation, sign remains unchanged.v) Multiplying or dividing by only equal negative number, inequation sign becomes opposite, that is, from < becomes >, from becomes . Number LinesPlease note i) A number line should have arrow sign at both ends of the line.ii) You should show at least one number more at both ends of the marking on the line. Say, b) Quadratic EquationsTypes of Problems Included in syllabusi) Solving Quadratic Equations by Factorization and Using Formulaii) Solving simple quadratic equation problems Formulae Standard form of the Quadradic Equation = ax2 + bx + c = 0, (a0) Characteristics of D Nature of Roots:a) If D = 0, then the roots will be equal and real. Lines are coincidentb) If D > 0, and is perfect square, then the roots will be real, unequal and rational. Lines are intersectingc) If D > 0, and is not perfect square, then the roots will be real, unequal and irrational.d) If D < 0, the roots will be imaginary. Parallel lines. If and are the roots of a quadratic equation, then:a) + = b/ab) =c/aQuadratic Equation: x2 (+) x + = 0. c) Ratio and Proportioni) If a, b, c & d are in proportiona/b = c/di.e. ad = bc (product of means = product of extremes) also called in proportion.ii) If a, b & c are in proportion a/b = c/d, i.e. b2 = ac (where b is the mean proportion and c is the third proportion) also called continued proportion.iii) If a, b, c & d are in continued proportiona/b = b/c = c/d K, Then c = dk, b = dk2, a = dk3.iv) If a, b, c & d are in proportion then use property of ratio. Types of Problems Included in syllabus i) Proportionii) Componendo, Dividendo, Alternendo, Invertendo Properties and their Combinationsiii) Direct simple applications on proportions only Formulae1. a/c = b/d By Alternendo 2. b/a = d/c By Invertendo 3. (a+b)/b = (c+d)/d By Componendo 4. (a-b)/b = (c-d)/d By Dividendo 5. (a+b) /(a-b) = (c+d)/(c-d) By Comp & Div 6. a/b = c/d = e/f = a+c+e / b+d+f By Property of ratio d) Factorization of Polynomials Types of Problems Included in syllabusi) Problems based on Factor Theorm and Remainder Theoremii) Factorising a polynomial completely after obtaining one factor by factor theoremTheorem Factor TheoremWhen a polynomial f(x) is divided by x a, the remainder = f (a). And, if remainder f(a)= 0; x a is a factor of polynomial f(x). OR if (x a) is a factor, the remainder is 0. Remainder TheoremIf f(x) is a polynomial, an expression with variable x and is divided by (x a); the remainderis the value of f(x) at x = a. i.e. the remainder is f(a) Complete factorizingLet f(x) be a Polynomial, divided by g(x), quotient be q(x), which leaves a remainder r(x).Then f(x) = g(x) q(x) + r(x).That is, Dividend = Divisor Quotient + Remainder Note: f(x) not to exceed degree 3 e) Matrices1. Order of a matrix Row and column Matrix Size of Matrix = No. of rows x No. of columns. (Rh Rows horizontal)2. Compatibility of Addition and MultiplicationMatrix A m x n can only be multiplied with matrix B p x q if n = p and then resultant matrix will have m rows and q cols i.e. R m x qMatrix multiplication is not commutative if AB BA Matrix multiplication is associative if A(BC) = (AB)C A X 1=1 X A =where Iis a unit matrix of suitable order 3. Distributive Property A (B+C) = AB+ACIf AB = AC then B C, A may or may not be zero. Null and Identity MatrixNull matrix = Identity Matrix = 5. Addition and Subtraction of 2 X 2 Matrices Only same order matrix can be added or subtracted 6. Multiplication of 2 X 2 Matrix by non zero rational number and another matrix f) Arithmetic and Geometric Progression Types of Problems Included in syllabusi) Finding the general termii) Finding sum of the first n termsiii) Simple Application Arithmetic ProgressionIf you have the sequence 2, 8, 14, 20, 26, then each term is 6 more than the previous term. Thisis an example of an arithmetic progression (AP) and the constant value that defines the difference between any two consecutive terms is called the common difference. Formulae1. Finding their General TermsIf an arithmetic difference has a first term a and a common difference of d, then we canwrite a,(a + d), (a + 2d) {a + (n-1) d}where the nth term = a + (n1) d 2. Finding the Sum of First nTH termsSum of Arithmetic seriesThe sum of an arithmetic series of n terms is found by making n/2 pairs each with thevalue of the sum of the first and last term. This gives us the formula:Sn =n/2 (a+1)where a = first term and l= last term.As the last term is the nth term = a + (n 1) d we can rewrite this as: Sn =n/2 (2a + (n-1)d) 3. Simple ApplicationsUse the first formula if you know the first and last terms; use the second if you know the first term and the common difference. Geometric Progression Geometric Sequence is a sequence such that any element after the first is obtained bymultiplying the preceding element by a constant called the Common Ratio which is denoted by r. The common ratio (r) is obtained by dividing any term by the preceding term, that is r = a2 /a1 or a2 /a2 so, r= an / an-1where, r = common ratio, a1= first term a2= second term a3= third term, andSo, Tn= nth term. Thus, Geometric Sequence is also known as the Geometric Progression, in short, GP. Example:The sequence 1, 2, 4, 8, 16, is a geometric sequence. Here, a = 1, r = 2/1 = 2,or, r = 4/2 = 2 etc. The geometric sequence has its sequence formation: a1, a1r, a1r2, a1r3, -, a1rn-1 , a1rn. Formulae 1. Common Term = an= a1rn-12. Sum of nth Term = Sn= a1 (1-rn) / 1-r , when r < 13. Also, Sn= a1 (rn -1) / r-1 , when r > 1 Linear Inequations: The signs >,< are called signs of inequality. On transferring +ve term becomes ve and vice versa. If each term is multiplied or divided by +ve number, the sign of inequality remains the same. The sign of inequality reverses: If each term is multiplied or divided by same negative number. If the sign of each term on both the sides of an inequation is changed. On taking reciprocals of both sides, in case both the sides are positive or negative. Always, write the solution set for the inequation, e.g.,{x : x3, x N}, solution set = {1, 2, 3} To represent the solution on a number line: Put arrow sign on both the ends of the line and keep extra integers beyond the range. Use dark dots on the line for each element of N, W and Z. For Q, R: mark range with solid circle (for or), hollow circle (for < and >.) and means Intersection (only common elements of the sets). or means Union(all elements of the sets without repetition). Quadratic Equations: 1. Quadratic equation is an equation with one variable, the highest power of the variable is 2. 2. Some useful results:a) (a + b)2 = a2 + b2 + 2abb) (a b)2 = a2 + b2 2abc) a2 b2= (a + b) (a b)d) (a + b)2 (a b)2 = 4abe) (a + b)3 = a3 + b3 + 3ab(a + b)f) (a b)3 = a3 b3 3ab(a b)g) (a + b + c)2 = a2 + b2 + c2 + 2ab + 2bc + 2cah) a3 + b3 + c3 3abc = (a + b + c) (a2 + b2 + c2 ab bc ca) 3. Steps for solving quadratic equation by factorizationa: Clear all fractions and brackets if necessary.b. Bring it to the form ax2 + bx + c = 0 by transposing terms.c. Factorize the expression by splitting the middle term as a sum of product of a and c. 4. Discriminant (D) = b2 4aca. if D > 0, then the roots are real and unequalb. if D = 0, then the roots are real and equalc. if D < 0, then the roots are not real (imaginary). 5. The roots of the quadratic equation ax2 + bx + c = 0 ; a 0 can be obtained by using the formula: Ratio and Proportion: A ratio is a comparison of the sizes of two or more quantities of the same kind by division. Since ratio is a number, so it has no units. To find the ratio between two quantities, change them to the same units. To compare two ratios, convert them into like fractions. In the ratio, a : b, a is called antecedent and b is called consequent. Compound ratio of a : b and c : d is (a c) : (b d) Duplicate ratio of a : b is a2 : b2 Triplicate ratio of a : b is a3 : b3 Sub-duplicate ratio of a : b is a: b Sub-triplicate ratio of a : b is : Reciprocal ratio of a : b is 3a: 3b Proportion- An equality of two ratios is called a proportion. Written as: a : b :: c : d or a/b = c/d Product of extreme terms = product of middle terms, if a, b, c, d are in proportion then ad = bc Continued Proportion- a : b :: b : c or a : b = b : c ; mean proportion (b) =ab Invertendo If a : b = c : d, then b : a = d : c Alternendo If a : b = c : d, then a : c = b : d Componendo If a : b = c : d, then a + b : b = c + d : d Dividendo If a : b = c : d, then a b : b = c d : d Componendo and Dividendo If a : b = c : d, then a + b : a b = c + d : c d Remainder and Factor Theorem:1. If f (x) is a polynomial, which is divisible by (x a), a R, then the remainder is f (a).2. If the remainder on dividing a polynomial f (x) by (x a), f (a) = 0, then (x a) is a factor of f (x).3. When f (x) is divided by (ax + b), then remainder is f (-b/a), a 04. When f (x) is divided by (ax b), then remainder is f ,(b/a) a 0 Matrices: 1. A rectangular arrangement of numbers, in the form of horizontal (rows) and vertical lines (columns) is called a matrix. Each number of a matrix is called its element. The elements of a matrix are enclosed in brackets [ ]. 2. The order of a matrix = No. of rows No. of columns 3. Row matrix: Only 1 row. [a b]4. Column matrix: Only 1 column. [a/b] Coordinate Geometry Co-ordinate GeometryReflectionFor any pointsP (a, b) MxP (a, b) Reflected in x axisP (a, b) MyP (-a, b) Reflected in y axisP (a, b) MoP (-a, -b) Reflected in origin Invariant point is a point which does not change under reflection. E.g. P (2, 0) Mx P (2, 0) Coordinates Formulae 1. Distance FormulaThe distance between two points A (x1, y1) and B (x2, y2) is given by: AB = ((x x)2 + (y y)) 2. Section FormulaA line-segment AB, where coordinates of A(x1, y1) and B(x2, y2), is divided internally by P(x, y) in the ratio m : n is given by: P(x, y) = (mx + nx / m+n , my + ny / m+n) A line-segment AB, where coordinates of A(x1, y1) and B(x2, y2), is divided externally by P(x, y) in the ratio m : n is given by: P(x, y) = (mx + nx / m-n , my + ny / m -n) 3. Mid Point formulaA line-segment AB, where coordinates of A(x1, y1) and B(x2, y2), is divided equally by P(x, y) in the ratio 1 : 1, that is, P is the mid-point of AB, is given by: P(x, y) = (1/2 (x2 + x1), 1/2(y2 + y1)) 4. Central FormulaIf three vertices of ABC are A (x1, y1), B (x2, y2) and C (x3, y3), then the Centroid O (x, y) of the triangle will be: P(x, y) = (1/3 (x2 + x1), 1/3(y2 + y1)) 5. Equation of a line Slope intercept from {m, c = y intercept}: y = mx + c. Slope point from {P (X1, Y1) & m}: y y1 = m (x x1), Two point from {P(X1, Y1) & Q(X2, Y2)} : (Y Y1) /(Y2 Y1) = (X X1) /(X2 X1) 6. Slope/Gradient/tanIf two points A (x1, y1) and B (x2, y2) lie on an inclined line-segment, then the slope [m] or gradient of the line-segment m = Y2 Y1 / X2 -X1 = tan where is the angle the line makes with the x axis;If Positive it is anti-clock wise. If Negative it is clock wise. Two or more points lie on a line if gradient of first segment = gradient of second part = gradient of third segment etc. 7. Conditions for two lines Two lines of slopes m1 and m2 will be i) If m1 = m2, lines are parallel. Here m1 = m2 Slopes are equal ii) If m1 m2 = 1, lines are perpendicular to each other. Here Slopes are negative reciprocal of each other. Reflection: Mx (x, y) = (x, -y) My (x, y) = (-x, y) Mo (x, y) = (-x, -y) X- axis: y = 0 Y-axis : x = 0 Any point that remains unaltered under a given transformation is called an invariant point. More Coordinate Geometry: Equation of a Line: Every straight line can be represented by a linear equation. Any point, which satisfies the equation of a line, lies on that line. Inclination of a line is the angle which the part of the line makes with x-axis. Inclination is positive in anti-clockwise direction and negative in clockwise direction. Slope or gradient of any inclined plane is ratio of vertical rise and horizontal distane. Inclination of x-axis and every line parallel to it is 0. Inclination of y-axis and every line parallel to it is 90. Slopes of two parallel lines are equal or m1 = m2. Product of the slopes of two perpendicular line = - 1 or m1 m2 = -1. Equation of a line:o y = mx + c : (Slope-intercept form : m = slope, c = y-intercept) o (y y1) = m(x x1) : (Slope-point form : (x1, y1) = co-ordinates of the point) o (y y1) = m(x x1) : (Two point form where m =). 9 10. LIST OF FORMULAE, ICSE MATH (X), By Rakesh Kushwaha (M.Sc.; B.Ed.); e-mail: rakeshpraxis@gmail.com GEOMETRY Symmetry:A figure is said to have line symmetry if on folding the figure about this line, the two parts of thefigure exactly coincide.Geometrical Name Line(s) of Symmetry Line segment 2 lines of symmetry line itself and perpendicular bisector of it. Angle with equal arms 1 line of symmetry the angle bisector A pair of equal parallel 2 lines of symmetry line midway and perpendicular bisector of them.line segmentsA scalene triangle Nil An isosceles triangle 1 the bisector of the vertical angle which is An equilateral triangle 3 the angle bisectors which are also side bisector of the base.bisectors. An isosceles trapezium 1 the line joining midpoints of the two parallel sides.A parallelogram Nil A Rhombus 2 the diagonals A rectangle 2 - the lines joining midpoints of the opposite sides. A square 4 the diagonals , lines joining midpoints of the opposite sides. A kite 1 the diagonal that bisects the pair of angles contained by equal sides. A circle Infinite all the diameters A semicircle 1 the A regular pentagon 5 - the angle bisectors or the A regular hexagon 6 - the angle bisectors, the bisector of the diameterbisectors of the sides.bisectors of the sides. 10 11. LIST OF FORMULAE, ICSE MATH (X), By Rakesh Kushwaha (M.Sc.; B.Ed.); e-mail: rakeshpraxis@gmail.com Similarity:Criteria for similarity 1. AA or AAAA drawn from vertex of a rt- d divides the BPT A line drawn || to any side of aThe areas of 2 similar 3. SSS into 2 similar , also to original triangle. divides other two sides proportionally. are proportional to the square of their corresponding sides. Median divides a triangle into 2If 2. SAS of equal area. have common vertex & are between same ||, ratio of their areas = ratio of bases. Scale factor = k, k = ; k2 = ; k3 = . Loci:The locus is the set of all points which satisfy the given geometrical condition.Locus of a point equidistant from 2 fixed points is bisector of line segment joining them. Locus of a point equidistant from 2 intersecting lines is angle bisector between the lines.Locus of a point at a constant distance from a fixed point is circle.Locus of a point equidistant from a given line is a pair of lines parallel to the given line and at thegiven distance from it.For equilateral triangle, centroid = incentre = circumcentre = orthocentre Circle:A line drawn from centre of a circle to bisect the chord is to the chord. A perpendicular line drawn to a chord from the centre of the circle bisects the chord.The bisector of a chord passes through the centre of the circle. One and only one circle can be drawn passing through 3 non-collinear points.Equal chords are equidistant from the centre.11 12. LIST OF FORMULAE, ICSE MATH (X), By Rakesh Kushwaha (M.Sc.; B.Ed.); e-mail: rakeshpraxis@gmail.comChords which are equidistant from the centre are equal in length.If the parallel chords are drawn in a circle, then the line through the midpoints of the chords passesthrough the centre.Greater the size of chord, lesser is its distance from the centre.Angle at the centre = 2 angle on the circumference.Angles in the same segment are equal.Angle in a semicircle is a right angle.The opposite angles of a cyclic quadrilateral are supplementary.If the opposite angles of a quadrilateral are supplementary, then the quadrilateral is cyclic.Angle in the major segment is acute and in the minor segment is obtuse.Exterior angle of a cyclic quadrilateral = Interior opposite angle.In equal or same circle. If two arcs subtend equal angle at the centre, then they are equal.In equal circle, if two arcs are equal, then they subtend equal angle at the centre.In equal circle, if two chords are equal, they cut off equal arcs.In equal circle, if two arcs are equal, the chords of the arcs are also equal.The tangent at any point of a circle & the radius through this point are to each other. If two tangents are drawn to a circle from an exterior point,o The tangents are equal,o They subtend equal angle at the centre of the circle,o They are equally inclined to the line joining the point and the centre of the circle.If two chords of a circle intersect internally/externally, the product of their segments is equal.Angle in the alternate segment are equal.Tangent2 = product of the lengths of the segments of the chord.Incentre Point of intersection of the angle bisectors.Cicumcentre - Point of intersection of the bisectors of the sides.12 13. LIST OF FORMULAE, ICSE MATH (X), By Rakesh Kushwaha (M.Sc.; B.Ed.); e-mail: rakeshpraxis@gmail.com MENSURATION Circumference and Area of a Circle:Circumference of a circle = 2 rCircumference of a semi-circle = r + 2rCircumference of a quarter-circle = r + 2r Area of a circle = r2Area of a circular ring = (R2 r2)Area of a semi-circle = r2 Area of a quarter-circle = r2 Distance trav

perpendicular line = 1.7. Equation of a line :a. y = mx + c Slope intercept form where y is m is the slope and c is the y-intercept.b. (y y1) = m(x x1) Slope point form where (x1, y1) are the coordinates of the point through which the line passes and m is the slope.c. (y y1) = m(x x1) where m -Two point form where (x1, y1) and (x2,y2) are the coordinates of the point through which the line passes. 1. Criteria for similarity 1. AA or AAA criteria 2. SAS criteria 3. SSS criteria2. A perpendicular drawn for the vertex of a right-angled triangle divides the triangle into two triangles similar to each other and also to the original triangle.3. Basic Proportionality Theorem A line drawn parallel to any side of a triangle divides the other two sides proportionally.4. The areas of two similar triangles are proportional to the square on their corresponding sides.5. Median divides a triangle into two triangles of equal area.6. If many triangles have a common vertex and their bases are along the same straight line, the ratio between their areas is equal to the ratio between the lengths of their bases. 7. Scale factor is given by the letter k. 1. A line drawn from the centre of a circle to bisect the chord is perpendicular to the chord.2. A perpendicular line drawn to a chord from the centre of the circle bisects the chord.3. The perpendicular bisector of a chord passes through the centre of the circle.4. One and only one circle can be drawn passing through three non-collinear points.5. Equal chords are equidistant from the centre.6. Chords which are equidistant from the centre are equal in length.7. If the parallel chords are drawn in a circle, then the line through the midpoints of the chords passes through the centre.8. Greater the size of the chord, lesser is its distance from the centre.9. Angle at the centre = 2 X Angle on the circumference10. Angles in the same segment are equal.11. Angle in a semicircle is a right angle.12. The opposite angles of a cyclic quadrilateral are supplementary.13. If the opposite angles of a quadrilateral are supplementary, then the quadrilateral is cyclic.14. Angle in the major segment in acute and in the minor segment is obtuse.15. Exterior angle of a cyclic quadrilateral = Interior opposite angle.16. In equal circles or in the same circle, if two arcs subtend equal angels at the centre, then they are equal.17. In equal circle, if two arcs are equal, then they subtend equal angles at the centre.18. In equal circles, if two chords are equal, they cut off equal arcs.19. In equal circle, if two arcs are equal, the chords of the arcs are also equal.20. The tangent at any point of a circle and the radius through this point are perpendicular to each other.21. If two tangents are drawn to a circle from an exterior point, a. The tangents are equal b. They subtend equal angles at the centre of the circle c. They are equally inclined to the line joining the point and the centre of the circle.22. If two circles touch each other (externally or internally) the line joining the centers of the circle passes through the point of contact.23. Direct common tangent = 24. Transverse common tangent = 25. If two chords of a circle intersect each other internally or externally, then the product of the lengths of their segments is equal.26. Angles in the alternate segment are equal.27. Tangent = Product of the lengths of the segments of the chord.28. Incentre Point of intersection of the angular bisectors.29. Circumcentre Point of intersection of the perpendicular bisectors of the sides.30. Orthocentre Point of intersection of the altitudes . 1. CIRCLE :a.Circumference = 2rb.Area = r22. CIRCULAR RING :a. Area = (R2 r2)3. Distance travelled by a wheel in one revolution = Its circumference.4. No. of Revolutions = 5.CUBOID:a.Volume = l X b X hb. TSA = 2(lb + bh + hl)c. Diagonal = 6.CUBE:a.Volume = ab.TSA = 6ac.Diagonal = a_/37.SOLID CYLINDER:a.Volume = rhb.CSA = 2rhc.TSA = 2rh + 2r8.HOLLOW CYLINDER:a.Volume = (R r)hb.TSA = 2Rh + 2rh + 2(R r) 9.RIGHT CIRCULAR CONE:a.Slant height l = _/h + rb.Volume = 1/3 rhc.CSA = rld.TSA = rl + r10.SPHERE:a.Volume = 4/3 rb. Surface area = 4r11.HEMISPHEREa.Volume = 2/3 rb.Curved Surface area = 2 rc.Total Surface Area = 3 r12.HOLLOW SPHERE:a.Volume = 4/3 pi(R r) 1. Arithmetic mean on non tabulated data 2. Arithmetic mean of tabulated data (Direct Method) : All Maths Formulas for Class 10 given here is ready by our Experts teachers at icseboards as per the most recent ICSE Class 10 Maths Syllabus and CISCE rules. Formulas of Maths for Class 10 will assist students with saving a ton of time during their exams. All Maths Formulas for Class 10 PDF by icseboards are up to this point the best and most study material for ICSE Class 10 Maths. 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