aglasem.com

FOR GOA CLASS 10 PREPARATION

Goa Board Class 10 Sample Paper 2027 Mathematics (E)

EXAM	YEAR	TYPE	SUBJECT
Goa Class 10	2027	Sample Paper	Maths

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

Grade 10 **Subject: MATHEMATICS**

PORTION AND MARKS DISTRIBUTION (2026-2027)

MONTH	Chapter No.	Topic	Marks	Hours
April	3	Pair of Linear Equations in 2 variables	9	15
JUNE	2	Polynomials	4	8
	6	Triangles	6	10
JULY	4	Quadratic Equations	8	10
	8	Introduction to Trigonometry	7	10
	9	Some Applications of Trigonometry	3	6
AUGUST	5	Arithmetic Progressions	5	10
	7	Co-ordinate Geometry	6	10
SEPTEMBER	PDF	Logarithms	4	10
	12	Areas related to circles	5	8
OCTOBER	10	Circles	4	10
	1	Real Numbers	4	8
NOVEMBER	14	Statistics	6	10
	15	Probability	3	5
DECEMBER	13	Surface area and Volume	6	10
		Total	**80 marks**	
INTERNAL ASSESSMENT (*Innovative activity*)		**One of the given 9 Innovative activities**	**20 marks**	10
		Total	**100 marks**	**150**

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

Rationalised syllabus 2026 – 2027

Sub: Mathematics (Level 1 and Level 2)

Grade 10

Chapter	Dropped topics (Level 1)	Dropped topics (Level 2)
1: Real Numbers	1.2 Euclid's Division Lemma 1.5 Revisiting Rational Numbers and their Decimal Expansions	1.2 Euclid's Division Lemma 1.5 Revisiting Rational Numbers and their Decimal Expansions
2: Polynomials	2.4 Division Algorithm for Polynomials	2.4 Division Algorithm for Polynomials
3: Pair of linear equations in two variables	3.4.3 Cross – Multiplication Method 3.5 Equation Reducible to a Pair of Linear Equations in Two Variables.	3.4.3 Cross – Multiplication Method 3.5 Equation Reducible to a Pair of Linear Equations in Two Variables.
4: Quadratic equations	4.4 Solution of a Quadratic Equation by Completing the Square	4.4 Solution of a Quadratic Equation by Completing the Square * Word problems
5: Arithmetic Progressions	No Deletions	No Deletions
6: Triangles	6.5 Areas of Similar Triangles 6.6 Pythagoras Theorem	6.5 Areas of Similar Triangles 6.6 Pythagoras Theorem * Riders
7: Coordinate geometry	7.4 Area of a Triangle	7.4 Area of a Triangle
8: Introduction to Trigonometry	8.4 Trigonometric Ratios of Complementary Angles	8.4 Trigonometric Ratios of Complementary Angles
9: Some applications of Trigonometry	No Deletions	No Deletions
10: Circles	No Deletions	No Deletions
11: Construction	Entire chapter deleted	Entire chapter deleted

12: Areas Related to Circles	12.4 Areas of Combinations of Plane Figures	12.4 Areas of Combinations of Plane Figures
13: Surface Areas and Volumes	13.4 Conversion of Solid from one Shape to Another 13.5 Frustum of a Cone	13.4 Conversion of Solid from one Shape to Another 13.5 Frustum of a Cone
14: Statistics	14.5 Graphical Representation of Cumulative Frequency Distribution	14.5 Graphical Representation of Cumulative Frequency Distribution * Finding mean by Step – Deviation method
15: Probability	No Deletions	No Deletions
*Logarithms (PDF)	No Deletions	No Deletions

 # Note: For Level 2 (Basic)

1) ***In the Chapter Pair of Linear Equations in Two Variables word problems involving only lower order thinking skills to be included.***

2) ***In the Chapter Introduction to Trigonometry, proving trigonometric identities involving only lower order thinking skills to be included.***

3) ***In the Chapter Some Applications of Trigonometry, word problems on heights and distances involving only one angle (either angle of elevation or depression) to be included.***

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

Exhaustive list of Activities to be performed as Internal Assessment

2026 – 2027

Sub: Mathematics (Level 1 and Level 2)

Grade 10

Sr.no.	TITLE OF ACTIVITY
1)	To find the mean, median and mode of data collected and draw its cumulative frequency curves.
2)	Body Mass Index (BMI).
3)	Relationship between volume of a Cylinder and volume of a Cone having equal heights and equal base areas.
4)	To estimate the number of tiles required for the floor of a classroom and cost of painting its walls.
5)	Comparing the volume of Cylinders obtained by folding a rectangular tin/cardboard/thick chart paper sheet along its length and breadth.
6)	To investigate the relationship between the dimensions of a Cuboid, its total surface area and volume.
7)	Fibonacci sequence and Golden rectangle.
8)	Pascal's Triangle.
9)	To measure heights and distances using a Clinometer.

Activity1: To find the mean, median and mode of data collected and draw its cumulative frequency curves.

Aim: To find the mean, median and mode of the data collected and draw its cumulative frequency curves.

Guidelines for students:

- Collect data [for example – marks obtained in mathematics by the SSC students of the previous year.]
- Construct a grouped frequency distribution table.
- Find the mean of the data by direct, assumed and step-deviation methods.
- Find the median and the mode of the data.
- Verify the empirical relationship between the three measures of central tendency.
- Draw cumulative frequency curves of the less than type and the more than type on a graph paper.
- Find the median of the data from the graph.

Learning outcomes:

This activity will help the students to

- gain practical knowledge of collecting data and calculating mean, median and mode of grouped data.
- understand the graphical representation of cumulative frequencies.
- enhance their statistical and graphical skills in analyzing and interpreting data.
- appreciate the practical application of descriptive statistics and graphical methods in summarizing data.

Activity 2: Body Mass Index (BMI)

Aim: To calculate the Body Mass Index (BMI) of school students and its implications on personal health **Guidelines for students:**

- Explore the concept of BMI, the BMI categories: underweight, normal weight, overweight and obesity and their implications on health.
- Select minimum ten schoolmates and record their height (in meters) and weight (in kilograms) in the table given below:

Schoolmate	height(m)	weight(kg)	$BMI = \frac{weight}{(height)^2}$	Inference
1.				
2.				
10.				

- Calculate the BMI for each selected schoolmate using the formula:

$$BMI = \text{weight} \div (height)^2 \ ; \ where\ weight\ is\ in\ kg\ and\ height\ is\ in\ meters$$

- Record the calculated BMI values in the above table and draw inference with the help of the table given below:

BMI	**INFERENCE**
below 18.5	underweight
18.5-24.9	healthy
25 and 29.9	overweight.
30 & above	obesity

- Calculate the average BMI and the percentage of students of the different categories for the selected group of school mates.
- Represent the data using a pie chart.

Note: The BMI of students of the whole school (if number is less) can finally be compiled and represented by a pie chart.

Learning outcomes:

This activity will help the students to

- gain practical experience in calculating BMI and analyzing health data.
- understand the importance of BMI in assessing and maintaining personal health.
- promote awareness of healthy lifestyle choices and provide guidance on maintaining a balanced BMI.

Activity 3: Relationship between volume of a Cylinder and volume of a Cone having equal heights and equal base areas.

Aim : To find the relationship between volume of a Cylinder and volume of a Cone having equal heights and equal base areas.

Guidelines for students:

- Prepare a Cylinder and a Cone having same height and base area using thick chart paper/cardboard.
- Calculate the volume of the Cylinder and the Cone using the formulae.
- Compare the calculated volumes of the Cylinder and the Cone.
- Verify the relationship by filling the Cone with fine sand/salt to its brim and emptying it in the Cylinder until it is completely filled.

Learning outcomes:

This activity will help the student to

- gain practical experience in making geometric shapes (Cylinder and Cone)
- find out and appreciate the relationship between the volume of Cylinder and Cone having equal heights and equal base areas leading to a deeper understanding of the concept of volume of Cylinder and Cone.

Activity 4: To estimate the number of tiles required for the floor of a classroom and cost of painting its walls.

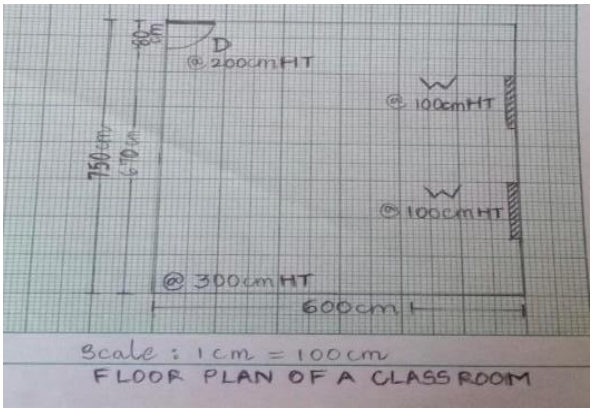
Aim: To draw the floor plan of a classroom and estimate the number of tiles needed for the floor and the amount of paint required for the 4 walls. **Guidelines for students :**

- Measure the length, breadth and height of a classroom.
- Measure the length and breadth of the door and windows of the classroom.
- Draw the plan of the classroom, including doors and windows on a graph paper by choosing an appropriate scale for the above measurements.
- Calculate the total floor area of the classroom.
- Find the dimensions of the tile to be used for the floor and calculate its area.
- Calculate the number of tiles needed to cover the entire floor area.
- Estimate the number of tile boxes required for the entire floor assuming that there are 10 tiles in each box.
- Calculate the total area of the 4 walls.
- Calculate the total area of the door and windows.
- Calculate the area to be painted.
- Find the cost of painting the 4 walls given the cost per square meter and estimate the amount of paint required in litres to paint the 4 walls.

Learning Outcomes:

This activity will help the students to

- gain practical experience in taking measurements, drawing plan, calculating area, and estimating material requirements for tiling and painting.
- enhance their skills in measurement, area calculation and estimation.



Activity 5: Comparing the volume of Cylinders obtained by folding a rectangular tin/cardboard/thick chart paper sheet along its length and breadth.

Aim: To compare the volumes of right circular Cylinders obtained by folding a rectangular tin sheet/cardboard/thick chart paper along its length and breadth.

Guidelines for students:

- Take two congruent rectangular tin/cardboard/ thick chart paper sheets where length is twice the breadth.
- Fold the first rectangular tin/cardboard/thick chart paper sheet along its length to form a hollow cylinder. Fix a circular base, whose circumference is equal to the breadth of the rectangle. Record the radius of the base and height of the resulting Cylinder.
- Similarly create another Cylinder by folding along its breadth. Record the dimensions of this second Cylinder.
- Calculate the volumes V_1 & V_2 of the two Cylinders using the formula : $V = \pi r^2 h$
- Repeat the same procedure for another set of congruent rectangles where length is thrice the breadth.
- Record the observations in the following table

(I) Rectangle Dimensions: L× *B*; where L= 2*B*			
Case i	Case ii	Comparison by taking	
Cylinder obtained by folding along its length	Cylinder obtained by folding along its breadth	Positive Difference	Ratio
r_1= _____	r_2= _____	$V_1 - V_2$	$\frac{V_1}{V_2}$
h_1= _____	h_2= _____		
V_1= _____	V_2= _____		
(II) Rectangle Dimensions: L× *B*; where L= 3*B*			
Case i	Case ii	Comparison by taking	
Cylinder obtained by folding along its length	Cylinder obtained by folding along its breadth	Positive Difference	Ratio
r_1= _____	r_2= _____	$V_1 - V_2$	$\frac{V_1}{V_2}$
h_1= _____	h_2= _____		
V_1= _____	V_2= _____		

- Compare the volumes of the two Cylinders formed by folding the rectangular tin/cardboard/ thick chart paper sheet along its length and breadth in both the cases.
- Explain how changes in dimensions impact the volumes of the Cylinders.
- Conclude by summarizing the key observations and inferences.

Learning Outcomes:

This activity will help the students to

- gain a practical understanding of how folding a rectangular tin /cardboard /thick chart paper sheet along its length and breadth affects the volumes of the resulting Cylinders.
- observe the impact of changes in dimensions on the volumes of the cylinders.
- connect geometric concepts with real-life applications and enhance their spatial reasoning skills.

7

Activity 6: To investigate the relationship between the dimensions of a Cuboid, its total surface area and volume.

Aim: To manipulate the dimensions of a Cuboid while keeping the total surface area fixed and observe how these changes affect the Cuboid's volume, specifically identifying a case where the volume is maximized.

Guidelines for students :

Three Dimensional Manipulations:

Manipulation 1 - Unequal dimensions ($l \neq b \neq h$):

- Prepare a Cuboid with all three dimensions l , b and h different .
- Calculate the Total Surface Area and Volume of the Cuboid.

Manipulation 2 – Any two dimensions equal ($l = b \neq h$):

- Prepare another Cuboid having same total surface area, by choosing any two dimensions equal and calculate the volume of the resulting Cuboid.

Manipulation 3 – Equal dimensions (l = b = h):

- Set all three dimensions equal to create a Cube having same total surface area.
- Calculate the volume of the Cube.
- Record your observations in the table given below:

	Solid	Length	Breadth	Height	TSA	Volume
1	Cuboid					
2	Cuboid					
3	Cube					

- Observe the relationship between the dimensions and the volume when the total surface area is kept constant.
- Identify the manipulation that results in the maximum volume.

Learning Outcomes:

This activity will help the students to

- gain hands-on experience in manipulating dimensions of a Cuboid while keeping the total surface area fixed.
- observe how changes in dimensions impact the volume of the Cuboid.
- enhance their understanding of optimization in geometry.
- appreciate the mathematical concepts involved in achieving specific outcomes, such as maximizing volume while fixing the total surface area.

Activity 7: Fibonacci sequence and Golden rectangle

Aim: To explore patterns in numbers through the Fibonacci sequence and the golden rectangle and to understand their applications in real-life situations.

Guidelines for students:

- Explore the Fibonacci sequence as a series of numbers where each number is the sum of the two preceding ones: 0, 1, 1, 2, 3, 5, 8, 13, 21, ...
- Explore the concept of the golden ratio and the golden rectangle, which arises from the Fibonacci sequence.
- Explore the properties and patterns observed in the Fibonacci sequence, such as the golden ratio (approximately 1.618) and its occurrence in nature, art and architecture.
- Explore the properties and characteristics of the golden rectangle, including its proportions and aesthetic appeal.
- Explore applications of the golden ratio and golden rectangle in art, design, and aesthetics, such as in the compositions of paintings, sculptures, and architecture.
- Investigate examples of the golden ratio and Fibonacci sequence in nature, such as the spiral patterns of sunflowers, pinecones, and seashells.
- Construct a golden rectangle using the golden ratio and discuss the properties and aesthetic appeal of the constructed golden rectangle.

Learning Outcomes:

This activity will help the students to

- gain an understanding of the properties and patterns of the Fibonacci sequence and the golden rectangle.
- appreciate the applications of these mathematical concepts in various disciplines, including art, architecture and nature.
- foster creativity and critical thinking by exploring real-life examples and applications of mathematical patterns.

Activity 8: Pascal's Triangle

Aim: To explore Pascal's Triangle, identify patterns within Pascal's Triangle and understand their applications in real-life situations.

Guidelines for students:

- Explore Pascal's Triangle, its basic properties and its formation, where each number in the triangle is the sum of the two numbers directly above it.
- Explore the patterns within Pascal's Triangle, such as Fibonacci numbers, binomial coefficients and triangular numbers.
- Observe how Pascal's Triangle relates to various mathematical concepts like binomial expansions and probability.
- Create own variations of Pascal's Triangle such as rotating it, skipping rows or using different starting numbers.
- Create visual representations of Pascal's Triangle and its patterns, using diagrams or presentations.
- Prepare a report summarizing the project findings, including explanations of observed patterns and connections to other mathematical concepts.

Learning Outcomes:

This activity will help the students to

- gain an understanding of the properties and patterns of Pascal's Triangle.
- appreciate the applications of Pascal's Triangle in Probability and Algebra.
- foster critical thinking and problem-solving skills by exploring real-life examples and applications of mathematical patterns.

9. To measure Heights and Distances using a Clinometer.

Aim: To enable the students to measure the heights and distances of any object in real life scenarios using a Clinometer.

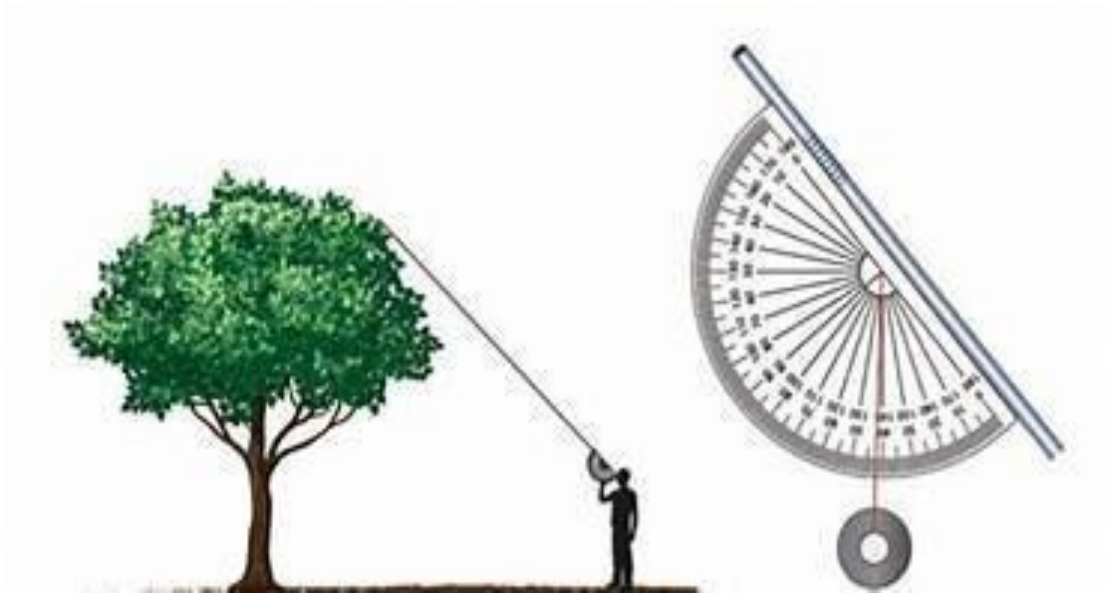
Guidelines for students:

- Explore the importance of measuring heights and distances accurately in various fields such as surveying, engineering and navigation.
- Prepare a clinometer- a tool to measure angles and know its basic working principle. (Video link is given below for reference) https://youtu.be/gHeiueRpX7U?si=-kaiAyxAL4tKc9fK
- Align the clinometer with the line of sight and measure the angle of elevation/depression.
- Calculate the height/distance of the object using trigonometric ratios.
- In case you want only angles of elevation of 30º, 45º or 60º then adjust your distance in front of the object till you obtain the above angles, then take the required measurement and find the height of the object.

Learning Outcomes:

This activity will help the students to

- enhance their understanding of trigonometric concepts and their practical applications in real-life scenarios.
- summarize the practical applications of using a clinometer in measuring heights and distances.



GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

INTERNAL ASSESSMENT SCHEME 2026 - 2027

Sub: Mathematics (Level 1 and Level 2)

Grade 10

- A list of **9 activities** for **Internal Assessment** of **20 marks** are given.
- Student may choose **any one** activity based on his/her capacity.
- Guidelines for each activity is provided for students. Teacher is free to give additional guidelines.
- Each activity is allotted maximum 20 marks.
- **Record of the activity (hard/ soft copy) of each student has to be maintained, for scrutiny by the Board.**
- **Assessment criteria for the activities is given below:**

CRITERIA	MARKS
1) Model prepared/Data collection (accuracy, neatness, creativity)	4mks.
2) Computation (logarithms may be used for calculations)	4mks
3) Project report (Mathematical content, organisation , presentation, neatness, creativity, diagram if any, resources used)	4mks
4) Oral presentation (clarity, logical sequence, effective communication)	4mks
5) Viva (mathematical reasoning, critical thinking)	4mks
TOTAL	**20 MARKS**

Rubrics for Internal Assessment Activities for Grade 10

Criteria	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)
Model prepared/ Data collected	The model is exceptionally attractive in terms of creativity, design and neatness	The model is attractive in terms of creativity, design and neatness	The model is acceptably attractive in terms of creativity, design and neatness	The model is not attractive in terms of creativity, design and neatness
	Data collected is exceptionally comprehensive and neatly organised	Data collected is comprehensive and neatly organised	Data collected is somewhat comprehensive and neatly organised	Data collected is not comprehensive and unorganised
Content, Resources, diagrams and computations	Extremely good content and resources used, Diagrams and computations are accurate	Good content and resources used, Diagrams and computations are mostly accurate	Content and resources used are satisfactory, Diagrams and computations are somewhat accurate	Content and resources used are unsatisfactory, Diagrams and computations are not accurate
Activity Report	Report is extremely well organised and written providing all the necessary details.	Report is well organised and written providing most of the necessary details	Report is satisfactorily organised and written providing few details.	Report is unorganised and written providing hardly any details
Oral presentation	Presented confidently with precise logical sequence and clarity	Presented with good confidence and acceptably precise logical sequence and clarity	Presented with logical sequence and clarity with satisfactory confidence	Not confidently presented and no logical sequence and clarity
Viva	Answered all the questions correct	One or two questions answered wrong.	Half of the questions answered wrong.	One or two questions answered correct

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

Mapping Syllabus with Curricular Goals and Competencies

2026 – 2027

Sub: Mathematics (Level 1 and Level 2)

Grade 10

Sr. No	Chapter	Curricular Goals	Competencies
1.	Real Numbers	CG – 1 CG – 2	C - 1.1 C - 2.1
2.	Polynomials	CG – 3	C - 3.1 C - 3.2
3.	Pair of Linear Equations in Two Variables	CG – 3 CG - 4	C – 3.2 C - 4.5
4.	Quadratic Equations	CG – 3	C - 3.2 C – 3.3
5.	Arithmetic Progressions	CG – 1 CG – 9	C- 1.1 C – 9.1
6.	Triangles	CG – 4 CG – 7 CG – 9	C - 4.1 C – 4.2 C – 7.3 C – 9.1
7.	Coordinate Geometry	CG – 4	C – 4.5
8.	Introduction to Trigonometry	CG – 4	C - 4.6
9.	Some applications of Trigonometry	CG – 4	C - 4.6
10.	Circles	CG – 4 CG – 7	C - 4.3 C – 4.4 C – 7.3
11.	Constructions	Chapter deleted	

12.	Areas Related to Circles	CG – 4 CG – 7	C - 4.3 C – 4.4 C – 7.3
13.	Surface Areas and Volumes	CG – 5 CG – 8	C – 5.2 C – 8.2 C - 8.3
14.	Statistics	CG – 6 CG - 9	C - 6.1 C – 9.1 C – 9.2
15.	Probability	CG – 6 CG - 11	C – 6.2 C – 11.1
PDF	Logarithms	CG – 9	C - 9.1 C – 9.3

Competency Based Learning Outcomes

Sub: Mathematics **Grade 10**

Chapter Name and Serial No:	Learning Outcomes
1. Real Number	The learner ● Generalises properties of numbers and relations among them studied earlier to evolve results such as Fundamental theorem of Arithmetic and applies them to solve problems related to real life contexts. ● Finds LCM and HCF of the given two numbers ● Identifies and proves a given number is an irrational number
2. Polynomials	The learner ● Develops a relationship between algebraic and graphical methods of finding the zeroes of a polynomial

	• Verifies the relationship between the Zeros and coefficients of a Polynomial
3. Pair of linear Equations in two variables	The learner • Finds solutions of pairs of linear equations in two variables using algebraic methods and the graphical method. • Solves problems related to real life context
4. Quadratic Equations	The learner • Demonstrates strategies of finding roots and determining the nature of roots of a quadratic equation • Formulates and solves the word problems reducible to quadratic equations
5. Arithmetic Progressions	The learner • Identifies the A.P from the given patterns of numbers • Applies the formulae of finding n^{th}term and sum of n terms of an A.P to solve problems • Develops strategies to apply the concept of A.P to daily life situations
6. Triangles	The learner • Works out ways to differentiate between congruent and similar triangles • Identifies similar triangles using the definition • Applies criteria of similarity of triangles to prove two triangles are similar • Applies the concept of similarity of two triangles to find unknown angles, lengths or perimeter. • Establishes properties for similarity of two triangles logically using different geometric criteria established earlier such as Basic Proportionality Theorem etc.

7. Coordinate Geometry	The learner ● Derives formulae to establish relations for geometric shapes in context of coordinate plane such as finding the distance between two given points, to determine the coordinates of a point between any two given points ● Applies distance formula and section formula to solve the problems
8. Introduction to Trigonometry	The learner ● Determines all trigonometric ratios with respect to a given acute angle of a right triangle ● Finds the other trigonometric ratios when one of the ratio is given ● Applies basic trigonometric identities to solve the problems
9. Some applications of Trigonometry	The learner ● Identifies angle of elevation and angle of depression ● Uses trigonometric ratios in solving problems in daily life contexts like finding heights of different structures or distance from them
10.Circles	The learner ● Demonstrates that the tangent to a circle is special case of secant and only two tangents can be drawn to a circle ● Derives proofs of theorems related to the tangents of a circle ● Applies theorems to solve problems
11.Constructions	Chapter deleted
12.Areas related to circles	The learner

	• Understands and applies the formulae of area of sector and segments of circles to solve the problems • Develops strategies to apply the concept of sector and segments of a circle to daily life situations
13.Surface Areas and Volumes	The learner • Find surface areas and volumes of objects in the surroundings by visualising them as as a combination of different solids like cylinder and a hemisphere, combination of different cubes etc. • Applies the knowledge to solve real life problems
14.Statistics	The learner • Calculates mean, median and mode for different sets of data related with real life contexts
15.Probability	The learner • Determines the probability of an event and applies the concept in solving daily life problems
16.Logarithms	The learner • Understands and applies laws of logarithms to simplify the algebraic expressions • Applies logarithms to solve real life problems

3.6.1 Pedagogy for Mathematics

3.6.1.1 Instructional practices

c.

d.

e.

f.

g.

h.

3.6.1.2 Some suggested methods of teaching

b.

c.

d.

e.

3.6.1.3 Integrating Mathematics with other Curricular Areas

a.

b.

Revised Bloom's Taxonomy

The revised Bloom's taxonomy includes the following levels:

- **Remembering:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts and answers.
- **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.
- **Applying :** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.
- **Analysing:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalization.
- **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on asset of criteria.
- **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

DESIGN OF SSC FINAL EXAM QUESTION PAPER (2026-2027)

Subject : MATHEMATICS (E) - LEVEL 2 (Basic)

Time : 3 hrs **Grade 10** **Max. Marks :80**

****

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows:

1. Weightage to the Learning objectives

Sr. No.	Learning Objectives	Marks	Percentage of Marks
1.	Remembering and Understanding	54	67.5%
2.	Applying	15	18.75%
3.	Analysing , Evaluating and Creating	11	13.75%
	Total	**80**	**100%**

2. Weightage to the different areas of Content

Chapter No.	Topic	Marks
1.	Real Numbers	04
2.	Polynomials	04
3.	Pair of Linear Equations in Two Variables	09
4.	Quadratic Equations	08
5	Arithmetic Progressions	05
6.	Triangles	06
7.	Coordinate Geometry	06
8.	Introduction to Trigonometry	07
9.	Some Applications of Trigonometry	03
10.	Circles	04
11.	Areas Related to Circles	05
12.	Surface Areas and Volumes	06
13.	Statistics	06
14.	Probability	03
PDF	Logarithms	04
	Total	**80**

3. Weightage to different form/type of Questions

Sr. No.	Form of Questions	Marks for each question	Number of questions	Total Marks
1.	Very Short Answer Type (VSA)	1	20	20
2.	Short Answer Type I (SA-I)	2	11	22
3.	Short Answer Type II (SA-II)	3	10	30
4.	Long Answer Type (LA)	4	2	08
	Total		**43**	**80**

4. The expected time for different type of questions would be as follows:

Sr. No.	Form of Questions	Approx. time for each question in mins (t)	Number of questions (n)	Approx. time for each form of questions in mins (t) x (n)
1.	Very Short Answer Type (VSA)	2	20	40
2.	Short Answer Type I (SA-I)	3	11	33
3.	Short Answer Type II (SA-II)	8	10	80
4.	Long Answer Type(LA)	13.5	02	27
	Total		**43**	**180**

5. Weightage to difficulty level of questions:

Sr. No.	Estimated difficulty level of questions	Percentage
1.	Easy	25%
2.	Average	60%
3.	Difficult	15%
	Total	**100%**

6. Number of Questions:

There will be **43** questions

Goa Board of Secondary and Higher Secondary Education
Blue Print of SSC Final Exam Question Paper 2026-2027
Std X : Mathematics (E) - Level 2 (Basic Mathematics)

Sr. No.	Topic	Objectives												Total
		Remembering & Understanding				Applying				Analysing , Evaluating &Creating				
		VSA	SAI	SAII	LA	VSA	SAI	SAII	LA	VSA	SAI	SAII	LA	
		1mk	2mk	3mk	4mk	1mk	2mk	3mk	4mk	1mk	2mk	3mk	4mk	
1	Real Numbers	1(1) 2(1)	21(2)											**3(4)**
2	Polynomials	3(1)	22(2)			15(1)								**3(4)**
3	Pair of Linear Equations in Two Variables	4(1)		*32(3)						19(1)			43(4)	**4(9)**
4	Quadratic Equations	5(1) 6(1)		33(3) 34(3)										**4(8)**
5	Arithmetic Progressions	7(1)	23(2) 24(2)											**3(5)**
6	Triangles		25(2)	35(3)						20(1)				**3(6)**
7	Coordinate Geometry	8(1)	*26(2)									41(3)		**3(6)**
8	Introduction to Trigonometry	9(1) 10(1)	*27(2)			16(1)	28(2)							**5(7)**
9	Some Applications of Trigonometry							38(3)						**1(3)**
10	Circles			36(3)		17(1)								**2(4)**
11	Areas Related to Circles	11(1)		37(3)		18(1)								**3(5)**
12	Surface Areas and Volumes	12(1)						*39(3)			29(2)			**3(6)**
13	Statistics		30(2)		42(4)									**2(6)**
14	Probability	13(1)	31(2)											**2(3)**
15	Logarithms	14(1)						40(3)						**2(4)**
	Total	**14(14)**	**9(18)**	**6(18)**	**1(4)**	**4(4)**	**1(2)**	**3(9)**	**0(0)**	**2(2)**	**1(2)**	**1(3)**	**1(4)**	
		30(54)				**8(15)**				**5(11)**				**43(80)**

NOTE: Figures outside the bracket indicate the question number and figures within the bracket indicate marks .

*In the topic of "**Pair of Linear equations in two variables**" , Word problem **OR** Finding the solution of a pair of linear equations in two variables by Graphical method may be tested. (Question no. 43)

* Indicates any one concept will be tested from that chapter

This is a model Blueprint, paper setter may make changes in the objectives chapter

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

GRADE 10 **MARCH 2027 EXAM**

MODEL PAPER

SUBJECT : MATHEMATICS (E) – Level 2 (BASIC)

Time : 3 hrs **Max. Marks: 80**

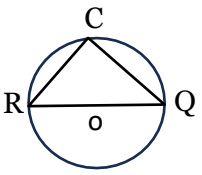
GENERAL INSTRUCTIONS:

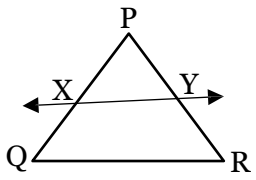
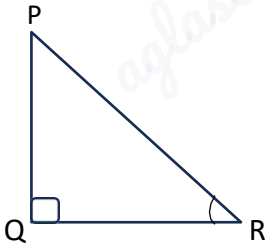
Read the following instructions very carefully and follow them :.

i) This question paper consists of **43** questions. All questions are compulsory.
ii) The question paper is divided into four Sections A**, B, C,** and **D**.
iii) In **Section A**, question numbers **1 to 18** are multiple choice questions **(MCQs)** and question numbers **19 and 20** are Assertion – Reason based questions of **1 mark** each.
iv) In **Section B**, question numbers **21 to 31** are short answer type I **(SA-I)** questions carrying **2 marks** each.
v) In **Section C**, question numbers **32 to 41** are short answer type II **(SA-II)** questions carrying **3 marks** each.
vi) In **Section D**, question numbers **42 and 43** are long answer **(LA)** questions carrying **4 marks** each.
vii) There is no overall choice. However, an internal choice has been provided in **two questions** of **2 marks** each in **Section B** and **two questions** of **3 marks** each in Section C.
viii) Logarithm and Antilogarithm tables are printed on the last page of the question paper.
ix) Use of calculator is NOT permitted.

Section A (1 mark each)

	Select and write the correct alternative from those given below each statement for question 1 to 18:
1	The irrational number from the following is: • $3\sqrt{3}$ • $\sqrt{3\times3}$ • $3\sqrt{3^2}$ • $3+\sqrt{9}$
2	If the product of two numbers is 315 and their HCF is 3, then their LCM is: • 15 • 45 • 105 • 945
3	The sum of the zeros of the quadratic polynomial $6x^2 - 14x + 4$ is: • $\frac{-7}{3}$ • $\frac{-2}{3}$ • $\frac{2}{3}$ • $\frac{7}{3}$
4	If $19x + 17y = 55$ and $17x + 19y = 53$, then the value of $x - y$ is: • 1 • 3 • -1 • -3
5	If the quadratic equation $ax^2 + bx + c = 0$ has no real roots, then: • $b^2 - 4ac > 0$ • $b^2 - 4ac = 0$ • $b^2 - 4ac < 0$ • $b^2 - 4ac \geq 0$
6	If one of the roots of the quadratic equation $2x^2 - px + 4 = 0$ is 2, then the value of p is: • - 6 • 2 • 4 • 6
7	The common difference for the AP: -5, -1, 3,…….is: • 4 • - 4 • 6 • - 6

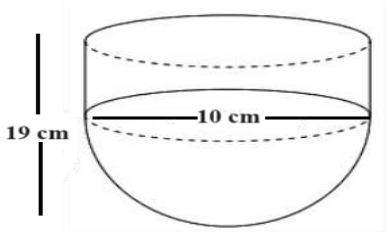
8	The coordinates of the midpoint of the line segment joining the origin and the point P(4, 6) are: • (0, 6) • (4, 0) • (2, 3) • (-2, -3)
9	If $sin^2B + cos^2\ 52^\circ = 1$, where B is an acute angle, then the value of B is : • 26° • 38° • 48° • 52°
10	If $2\sin\theta = \sqrt{3}$ then the value of θ *is* : • 30° • 45° • 60° • 90°
11	The circumference of a circle is 22 cm. If the central angle of a sector of the circle is 144°, then the area of the sector is : A) 12.6 cm² B) 15.4 cm² C) 18.7cm² D) 9.5 cm²
12	The total surface area of a solid hemisphere of radius 1 cm is : • $\frac{2}{3}\pi$ cm² • 2π cm² • 3π cm² • $\frac{4}{3}\pi$ cm²
13	If a letter is chosen at random from the letters of the English alphabet, then the probability that it is a letter of the word ADDITION is: • $\frac{2}{13}$ • $\frac{3}{13}$ • $\frac{4}{13}$ • $\frac{5}{26}$
14	The value of $\log_{10} 1$ is : • 0 • 0.1 • 1 • 10
15	If α and β are the zeros of a quadratic polynomial such that $\alpha + \beta = 15$ and $\alpha - \beta = 9$. The quadratic polynomial having α and β as its zeros is : • $x^2 + 15x + 36$ • $x^2 - 15x + 36$ • $x^2 - 9x + 15$ • $x^2 + 9x + 15$
16	In the figure, RQ is the diameter of the circle. Therefore the value of tan R × tan Q is: • 0 • 1 • $\sqrt{3}$ • 3 
17	AX and AY are tangent segments from external point A to a circle with centre O . If ∠XAY =100° , then ∠XYO is : • 40° • 50° • 80° • 100°
18	The perimeter of the wall-hanging in the form of a sector with radius 10.5 cm and sector angle 60º is: • 48 cm •96 cm • 64 cm • 32 cm
	Directions : **In Q. No. 19 and 20, a statement of Assertion(A) is followed by a statement of Reason(R) . Select and write the correct option from the following :** • Both, Assertion (A) and Reason (R) are true. Reason (R) explains Assertion (A) completely. • Both , Assertion (A) and Reason (R) are true . Reason (R) does not explain Assertion (A). • Assertion (A) is true but Reason (R) is false. • Assertion (A) is false but Reason (R) is true.

19	Assertion (A): The pair of linear equations $5x + 2y + 6 = 0$ and $7x + 6y + 18 = 0$ have infinitely many solutions. Reason (R) : The pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ have infinitely many solution if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
20	Assertion (A): D and E are points on the sides AB and AC respectively of a ΔABC such that $DE \parallel BC$ then the value of x is 4, when AD = x cm, DB = (x –2) cm, AE = (x + 2) and EC = (x –1) cm. Reason (R) : If a line is parallel to one side of a triangle then it divides the other two sides in the same ratio.
	Section B (2 marks each)
21	Find the LCM of 330 and 242 by prime factorization method.
22	Write a polynomial in 'x' whose zeros are $-\frac{3}{2}$ and $\frac{4}{5}$
23	Find the sum of first 15 terms of the Arithmetic Progression : 6, 13, 20,…
24	The 10^{th} term of an Arithmetic Progression is 52 and the 15^{th} term is 77. Find the first term.
25	In triangle PQR, XY // QR, such that P-X-Q and P-Y-R If $\frac{PX}{QX} = \frac{3}{5}$ then find the value of $\frac{QR}{XY}$ 
26	Find the distance between the points A(5 , -7) and B (2 , -3). **OR** Point P(x, y) divides the line segment joining points A(3, 7) and B(-5, 2) in the ratio 3 : 2 . Find the values of 'x' and 'y'.
27	In ΔPQR , $\angle$ PQR = 90° and tan R = $\frac{8}{15}$. Find the length of PR and the value of sec P.  **OR** Evaluate the following expression using known numerical values of trigonometric ratios : $\frac{cos^2 30°}{1 + cosec^2 45°}$

28 Prove the trigonometric identity :

$$\cot A + \tan A = \sec A \operatorname{cosec} A$$

29 A vessel is in the form of a hollow cylinder mounted on a hollow hemisphere. The diameter of the hemisphere is 10 cm and the total height of the vessel is 19 cm. Find the inner surface area of the vessel.
(Take $\pi = 3.14$)



30 The table given below shows marks scored by 40 students in a maths test.
Find the median of the data.

Marks	No of students
0 – 10	2
10 – 20	8
20 – 30	16
30 – 40	8
40 – 50	6

31 A box contains cards bearing numbers 1,2,3,4, ……, 20. A card is drawn at random from the box. Find the probability that the number on the card drawn is :
(i) a prime number
(ii) divisible by 2 or 3

Section C (3 marks each)

32 Find the solution of the pair of linear equations 3x + 4y = 10 and 5x – 2y = 8 by Elimination method.

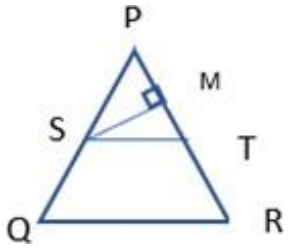
OR

Find the solution of the pair of linear equations 3x – y = 2 and 5x – 2y = 1 by Substitution method.

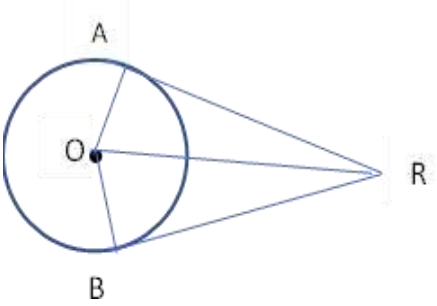
33 Find the roots of the quadratic equation $6x^2 - 19x + 8 = 0$ by Factorisation Method.

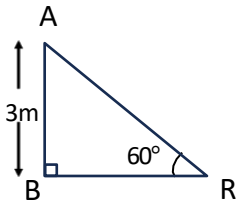
34 Find the roots of the quadratic equation $3x^2 + 8x + 5 = 0$ by using the Quadratic Formula.

35 In triangle PQR, ST // QR, SM ⊥ PR,
Show that: $\frac{PS}{SQ} = \frac{PT}{TR}$



36 In the figure, O is the centre of a circle with a radius 6cm. R is a point in the exterior of a circle, such that OR=10cm. RA and RB are tangents to the circle. Find the length of the tangents at points A and B.



37	A chord of a circle of radius 14cm subtends an angle of 90° at the centre. Find the area of the major segment of the circle. (Take $\pi = \frac{22}{7}$)
38	A ladder is placed against a pole AB such that its upper end is touching the top of the pole. If the pole is 3m high and the ladder makes an angle of 60° with the horizontal, then find the length of the ladder. (Take $\sqrt{3}$ = 1.73) 
39	A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.8 cm, find the volume of the wooden toy. (Take $\pi = \frac{22}{7}$) OR An iron pillar has some part in the form of a right circular cylinder and remaining in the form of a right circular cone. The radius of the base of each of cone and cylinder is 8 cm. The cylindrical part is 240 cm high and the conical part is 36 cm high. Find the total surface area of 20 such pillars. (Take $\pi = \frac{22}{7}$)
40	Evaluate the following expression by using the logarithm method. $\frac{\sqrt{40.87} \times (0.563)^2}{0.0879}$
41	If P(2, -1) , Q(7 , 3) and R (k , 4) are the vertices of an isosceles triangle with PQ = PR , then find the value of 'k'.
	Section D (4 marks each)
42	The table given below shows the daily expenditure of some families in a village.

Daily Expenditure	**No of families**	**Class mark x_i**	di = xi - a	$f_i d_i$
0 – 100	4			
100 – 200	7			
200 – 300	11			
300 – 400	8			
400 – 500	7			
500 – 600	3			
Total	$\sum f_i$ =			$\sum f_i d_i$=

Rewrite and complete the table and find the mean daily expenditure of the families by taking 'a' as the assumed mean of the interval 300-400 using the assumed mean method.

43	The sum of the digits of a two-digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Find the number.

****

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5566	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6345	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7769	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9843	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1289	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6715	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	12	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

****

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

DESIGN OF SSC FINAL EXAM QUESTION PAPER (2026-2027)

Subject : MATHEMATICS (E) - LEVEL 1 (Standard)

Time : 3 hrs **Grade 10** **Max. Marks :80**

****

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows:

1. Weightage to the Learning objectives

Sr. No.	Learning Objectives	Marks	Percentage of Marks
1.	Remembering and Understanding	44	55%
2.	Applying	19	24%
3.	Analysing , Evaluating and Creating	17	21%
	Total	**80**	**100%**

2. Weightage to the different areas of Content

Chapter No.	Topic	Marks
1.	Real Numbers	04
2.	Polynomials	04
3.	Pair of Linear Equations in Two Variables	09
4.	Quadratic Equations	08
5	Arithmetic Progressions	05
6.	Triangles	06
7.	Coordinate Geometry	06
8.	Introduction to Trigonometry	07
9.	Some Applications of Trigonometry	03
10.	Circles	04
11.	Areas Related to Circles	05
12.	Surface Areas and Volumes	06
13.	Statistics	06
14.	Probability	03
PDF	Logarithms	04
	Total	**80**

3. Weightage to different form/type of Questions

Sr. No.	Form of Questions	Marks for each question	Number of questions	Total Marks
1.	Very Short Answer Type (VSA)	1	20	20
2.	Short Answer Type I (SA-I)	2	9	18
3.	Short Answer Type II (SA-II)	3	10	30
4.	Long Answer Type (LA)	4	3	12
	Total		**42**	**80**

4. The expected time for different type of questions would be as follows:

Sr. No.	Form of Questions	Approx. time for each question in mins (t)	Number of questions (n)	Approx. time for each form of questions in mins (t) x (n)
1.	Very Short Answer Type (VSA)	2	20	40
2.	Short Answer Type I (SA-I)	3	9	27
3.	Short Answer Type II (SA-II)	8	10	80
4.	Long Answer Type(LA)	11	03	33
	Total		**42**	**180**

5. Weightage to difficulty level of questions:

Sr. No.	Estimated difficulty level of questions	Percentage
1.	Easy	20%
2.	Average	60%
3.	Difficult	20%
	Total	**100%**

6. Number of Questions:

There will be **42** questions

Goa Board of Secondary and Higher Secondary Education
Blue Print of SSC Final Exam Question Paper 2026-2027
Std X : Mathematics (E) - Level 1 (Standard Mathematics)

Sr. No.	Topic	Objectives												Total
		Remembering & Understanding				Applying				Analysing , Evaluating & Creating				
		VSA	SAI	SAII	LA	VSA	SAI	SAII	LA	VSA	SAI	SAII	LA	
		1mk	2mk	3mk	4mk	1mk	2mk	3mk	4mk	1mk	2mk	3mk	4mk	
1	Real Numbers	1(1) 2(1)									26(2)			**3(4)**
2	Polynomials	3(1)				15(1)					27(2)			**3(4)**
3	Pair of Linear Equations in Two Variables	4(1)		*30(3)						19(1)			41(4)	**4(9)**
4	Quadratic Equations	5(1)		*31(3)									42(4)	**3(8)**
5	Arithmetic Progressions	6(1)		32(3)		16(1)								**3(5)**
6	Triangles		21(2)					34(3)		20(1)				**3(6)**
7	Coordinate Geometry	7(1)	*22(2)									39(3)		**3(6)**
8	Introduction to Trigonometry	8(1)	*23(2)			17(1)		35(3)						**4(7)**
9	Some Applications of Trigonometry							36(3)						**1(3)**
10	Circles	9(1) 10(1)	24(2)											**3(4)**
11	Areas Related to Circles	11(1)		33(3)		18(1)								**3(5)**
12	Surface Areas and Volumes	12(1)	25(2)					37(3)						**3(6)**
13	Statistics		28(2)		40(4)									**2(6)**
14	Probability	13(1)	29(2)											**2(3)**
15	Logarithms	14(1)						38(3)						**2(4)**
	Total	**14(14)**	**7(14)**	**4(12)**	**1(4)**	**4(4)**	**0(0)**	**5(15)**	**0(0)**	**2(2)**	**2(4)**	**1(3)**	**2(8)**	**42(80)**
		26(44)				**9(19)**				**7(17)**				

NOTE: Figures outside the bracket indicate the question number and figures within the bracket indicate marks.

*In the topic of "**Pair of Linear equations in two variables**" , Word problem **OR** Finding the solution of a pair of linear equations in two variables by Graphical method may be tested. (Question no. 41)

***Indicates any one concept will be tested from that chapter

This is a model Blueprint, paper setter may make changes in the objectives chapter wise.

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO-BETIM GOA 403521

GRADE 10 **MARCH 2027 EXAM**

MODEL PAPER

SUBJECT : MATHEMATICS (E) - (STANDARD)

TIME : 3 Hrs **MAX. MARKS : 80**

GENERAL INSTRUCTIONS:

Read the following instructions very carefully and follow them :

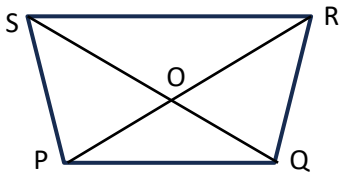
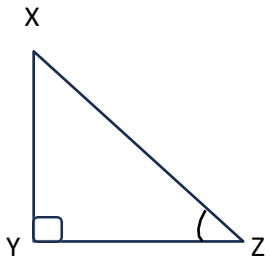
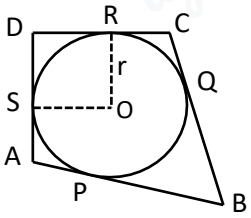
i) This question paper consists of 42 questions. All questions are compulsory.
ii) The question paper is divided into four Sections A, B, C and D.
iii) In Section A, question numbers 1 to 18 are multiple choice questions (MCQs) and question numbers 19 and 20 are Assertion – Reason based questions of 1 mark each.
iv) In Section B, question numbers 21 to 29 are short answer type I (SA-I) questions carrying 2 marks each.
v) In Section C, question numbers 30 to 39 are short answer type II (SA-II) questions carrying 3 marks each.
vi) In Section D, question numbers 40 to 42 are long answer (LA) questions carrying 4 marks each.
vii) There is no overall choice. However, an internal choice has been provided in two questions of 2 marks each in Section B and two questions of 3 marks each in Section C.
viii) Logarithm and Antilogarithm tables are printed on the last page of the question paper.
ix) Use of calculator is NOT permitted.

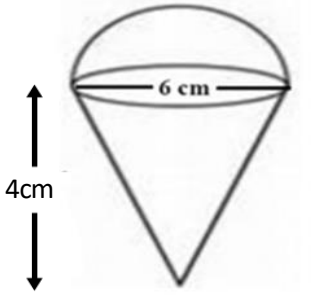
	SECTION A (1 mark each)
	Select and write the correct alternative from those given below each statement for question 1 to 18 :
1	The number 200 when expressed as product of prime numbers is written as: • 5×2^4 • $5^3\times2^2$ • $5^3\times2^3$ • $5^2\times 2^3$
2	$If\ the\ product\ of\ two\ numbers\ is\ 1690\ and\ their\ HCF\ is\ 13\ ,then\ their\ LCM\ is$: • 13 • 130 • 169 • 2197

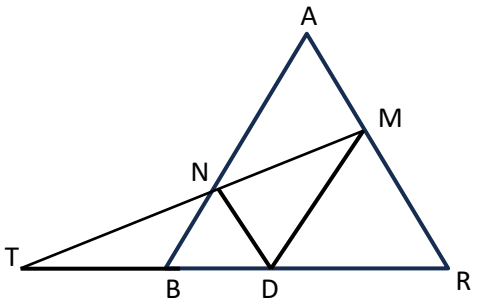
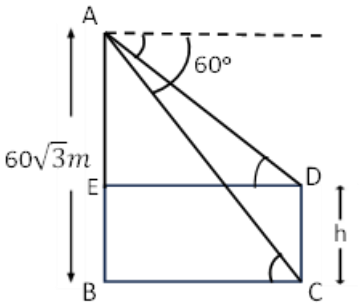
3	A quadratic polynomial in 'x' whose zeros are $\frac{3}{2}$ and 5 is: • $x^2 + 13x + 15$ • $x^2 - 13x + 15$ • $2x^2 + 13x + 15$ • $2x^2 - 13x + 15$
4	If $x + y = 5$ and $x - y = 1$ then the value of $\frac{x}{y}$ is: $\frac{-3}{2}$ $\frac{-2}{3}$ $\frac{2}{3}$ $\frac{3}{2}$
5	If the discriminant of the quadratic equation $3x^2 - 10x + k = 0$ is 196 then the value of k is: • -8 • 7 • 8 • 14
6	The 27^{th} term from the last term of the AP: 3, 8, 13,....., 253 is: • 116 • 123 • 153 • 162
7	The ratio in which the point $(-1, 6)$ divides the line segment joining the points A$(-3, 10)$ and B$(6, -8)$ internally is: • 2 : 1 • 1 : 2 • 2 : 7 • 7 : 2
8	If $3\cos A = 5$ then the value of sec A is: • $\frac{3}{5}$ • 1 • $\frac{5}{3}$ • 2

9	GF and GH are two tangents drawn from an external point G of a circle with centre O. If $\angle FGO=55°$, then $\angle$ FOH is: • 35° • 40° • 70° • 110°
10	Point P is at a distance of 13 cm from the centre O of a circle with a radius of 5 cm. The length of the tangent segment from point P to the circle is: • 8 cm • 12 cm • 25 cm • 144 cm
11	If the circumference and the area of a circle are numerically equal then the diameter of the circle is: • 1 cm • 2 cm • 3 cm • 4 cm
12	Two cubes of side 3 cm are joined end to end. Therefore the surface area of the resulting cuboid is: • 45 cm^2 • 54 cm^2 • 90 cm^2 • 108 cm^2
13	Which of the following can be the probability of an event? • $\frac{0.1}{0.001}$ • $\frac{0.03}{0.3}$ • $\frac{0.5}{0.05}$ • $\frac{1.3}{1.2}$
14	The value of $\log_2 8 + \log_2 4$ is: • 3 • 4 • 5 • 6

15	If the product of zeros of the quadratic polynomial $9x^2 - kx - 6$ is twice the sum of zeros , then the value of k is: • -3 • -2 • 2 • 3
16	If $x + 1$, $3x$ and $4x + 2$ are the first three terms of an AP , then the fourth term is: • 15 • 17 • 19 • 21
17	The value of $5tan^2\theta - 5\ sec^2\theta$ is: • -5 • 0 • 1 • 5
18	A pendulum swings through an angle of 30° and describes an arc 8.8 cm in length. The length of the pendulum is: • 15 cm • 15.5 cm • 16 cm • 16.8 cm
	Directions : **In Q. No. 19 and 20, a statement of Assertion(A) is followed by a statement of Reason(R) .** **Select the correct option from the following options :** • Both, Assertion (A) and Reason (R) are true. Reason (R) explains Assertion (A) completely. • Both , Assertion (A) and Reason (R) are true . Reason (R) does not explain Assertion (A). • Assertion (A) is true but Reason (R) is false. • Assertion (A) is false but Reason (R) is true.
19	Assertion (A) : The lines for the pair of linear equations $5x + 2y + 6 = 0$ and $10x + 4y - 7 = 0$ are parallel. Reason (R) : The pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are called inconsistent pair of equations if $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

20	Assertion (A) : X and Y are points on the sides AB and AC respectively of a ΔABC such that AX = 5.7 cm , XB = 9.5 cm , AY = 4.8 cm and YC = 8 cm , then XY is not parallel to BC. Reason (R) : If a line divides any two sides of a triangle in the same ratio , then it is parallel to the third side.
	SECTION B (2 marks each)
21	In the figure , PQRS is a trapezium in which PQ ∥ SR and its diagonals intersect at O. If OR = (3x−1) cm , OP= 5 cm , OS = (2x+3) cm and OQ = 7 cm , then find the value of x. 
22	Find the value of 'k' if the point P(3 , -2) is equidistant from the points A(5 , k) and B(k , -4). OR If the distance between the points P(k , 5) and Q (3 , -7) is 13 sq. units , then find the value of k .
23	In ΔXYZ , $\angle$ XYZ = 90° and cot Z = $\frac{2}{\sqrt{5}}$ Find the length of XZ and the value of cosec X.  OR Evaluate the following expression using known numerical values of trigonometric ratios : $1+ cosec^2\ 60° - \frac{3}{4} sec^2\ 45°$
24	ABCD is a quadrilateral such that $\angle D = 90°$. A circle with centre O touches the sides AB , BC , CD , and DA at P , Q , R and S respectively. If BC = 39cm , CD = 25 cm and BP = 28 cm , find the radius of the circle. 

<table>
<tr><td>25</td><td>An ice cream cone consists of a cone with a hemispherical shape on top filled with ice cream. The conical part has a height of 4cm and a diameter of 6cm, as shown in the figure . Find the total volume of the ice cream .
(Do not substitute the value of π)

</td></tr>
<tr><td>26</td><td>In a school there are two sections , namely A and B of class X. Section A has 42 students and Section B has 48 students. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B.</td></tr>
<tr><td>27</td><td>Find the zeros of the quadratic polynomial $x^2 - 8x + 12$ and verify the relation between the zeros and the coefficients.</td></tr>
<tr><td>28</td><td>If the median height of 50 students in a class, based on the following frequency distribution, is 144 cm, find the missing frequencies x and y.
<table>
<tr><td>Height (in cm)</td><td>125-130</td><td>130-135</td><td>135-140</td><td>140-145</td><td>145-150</td><td>150-155</td><td>155-160</td></tr>
<tr><td>No. of students</td><td>2</td><td>4</td><td>x</td><td>y</td><td>8</td><td>9</td><td>5</td></tr>
</table></td></tr>
<tr><td>29</td><td>A pack of 52 playing cards has the black kings, the queen of diamonds and the jack of spades removed. After reshuffling the remaining cards, one card is drawn at random. Find the probability that the drawn card is:
(i) a red card
(ii) a face card</td></tr>
<tr><td></td><td>SECTION C (3 marks each)</td></tr>
<tr><td>30</td><td>Find the solution of the pair of linear equations $5x + 2y = 16$ and $7x - 3y = 34$ by Elimination method .
OR
Find the solution of the pair of linear equations $2x + 3y = 4$ and $3x - y = -5$ by Substitution method.</td></tr>
<tr><td>31</td><td>Find the roots of the quadratic equation $6x^2 - 19x + 10 = 0$ by Factorisation method .
OR
Find the roots of the quadratic equation $2x^2 - 8x + 7 = 0$ by using the Quadratic formula.</td></tr>
<tr><td>32</td><td>A flower bed contains rows of rose plants, with the number of plants in each row decreasing by 2. The first row has 43 rose plants, the second row has 41, and so on, until the last row, which has 11 rose plants. How many rows are there in the flower bed?</td></tr>
</table>

33	A cow is tied to a rope with a length of 12 m at the corner of a rectangular field with dimensions 25 m x 45 m. If the length of the rope is increased to 23 m, then find the additional grassy area that the cow will be able to graze. (Take $\pi = \frac{22}{7}$)
34	D is any point on side BR of ΔABR. DM‖ AB and DN‖ AR , A-N-B and A-M-R . MN and RB meet at T when produced. Prove that : $TD^2 = TB \times TR$ 
35	Prove the trigonometric identity : $\frac{1+sec\theta-\tan\theta}{1+sec\theta+\tan\theta} = \frac{1-sin\theta}{cos\theta}$
36	From the top of a cliff AB $60\sqrt{3}$ m high , the angles of depression of the top and bottom of a tower DC are 45° and 60° respectively. Find the height of the tower. 
37	A toy is shaped like a right circular cylinder with a hemisphere at one end and a cone at the other. The cylindrical part has a height of 13 cm and a radius of 5 cm. The hemispherical and conical parts have the same radius as the cylindrical part, and the conical part has a height of 12 cm. Calculate the cost of painting the toy at ₹8.50 per cm^2. (Take $\pi = \frac{22}{7}$)
38	Evaluate the following expression by using the logarithm method. $\sqrt{\frac{(3.68)^3 \times 0.0072}{9.253}}$
39	If A(−2 , y) , B(−4,−2) , C (x , −2) and D(7,3) are the vertices of a parallelogram taken in order, then find the length of the diagonal AC.

SECTION D (4 marks each)

40 The table below shows the number of people in various age groups attending a yoga camp.

Age group C.I	No. of people (f_i)	Class mark (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
20 – 30	36			
30 – 40	28			
40 – 50	16			
50 – 60	10			
60 – 70	7			
70 – 80	3			
Total	$\sum f_i =$ ___			$\Sigma f_i u_i =$ ___

Taking the class mark denoted by 'a' of the class interval $40-50$ as the assumed mean , rewrite and complete the table and then calculate the average age of the people attending the camp using the step deviation method.

41 A train covered a certain distance at a uniform speed. If the train had been 6 km/h faster, it would have taken 4 hours less than the scheduled time. If the train had been 6 km/h slower, it would have taken 6 hours more than the scheduled time. Find the distance covered by the train.

42 A piece of cloth costs ₹1080. If the piece was 3 metres longer and each meter of cloth cost ₹60 less, the cost of the piece would remain unchanged. Find the length of the piece and its original rate per metre.

****

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5566	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6345	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7769	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9843	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1289	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference								
											1	2	3	4	5	6	7	8	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6715	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	12	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

****