SYLLABUS

Annexure 'E'

MATHEMATICS(041)

SA-II (2012-13)

Second Term		**Marks: 90**
	UNITS	**MARKS**
II	**ALGEBRA**	**16**
III	**GEOMETRY (Contd.)**	**38**
V	**MENSURATION (Contd.)**	**18**
VI	**STATISTICS AND PROBABILITY**	**18**
	TOTAL	**90**

The Question Paper will include value based question(s) To the extent of 3-5 marks.

- **The Problem Solving Assessment will be conducted for all students of class IX in Jan – Feb 2013 and the details are available in a separate circular.**
- **The `Problem Solving Assessment' (CBSE-PSA) will be counted towards FA-4 which is 10% of total assessments of Class IX. This assessment will also be carried forward towards the FA-4 in Class X. This score will be reflected in one Language (English or Hindi), Mathematics, Science and Social Science w.e.f the session 2012-2013 for Class IX and 2013 – 14 for Class X.**
- **The same score will be reflected in FA-4 for class IX and Class X.**
  The students will have the option to improve their PSA Score in Class X, as they can sit for the test with Class IX students of the Session 2013-2014 in January – February 2014. The best scores will be reflected in the final certificate in case of those applying for improvement.
- **The schools which have already planned their time table and other details regarding FA-4 will take the best scores of FA-3 and FA-4 to count towards the total 10%, now available for FA-3 and FA-4 taken together.**

UNIT II : ALGEBRA (Contd.)

2. LINEAR EQUATIONS IN TWO VARIABLES (14) Periods

Recall of linear equations in one variable. Introduction to the equation in two variables. Prove that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III : GEOMETRY (Contd.)

4. QUADRILATERALS (10) Periods

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sides are equal, and conversely.
3. (Motivate) In a parallelogram opposite angles are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse.

5. AREA (4) Periods

Review concept of area, recall area of a rectangle.

1. (Prove) Parallelograms on the same base and between the same parallels have the same area.
2. (Motivate) Triangles on the same base and between the same parallels are equal in area and its converse.

6. CIRCLES (15) Periods

Through examples, arrive at definitions of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
3. (Motivate) There is one and only one circle passing through three given non-collinear points.
4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center(s) and conversely.
5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
6. (Motivate) Angles in the same segment of a circle are equal.
7. (Motivate) If a line segment joining two points subtendes equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
8. (Motivate) The sum of the either pair of the opposite angles of a cyclic quadrilateral is 180^{o} and its converse

7. CONSTRUCTIONS (10) Periods

1. Construction of bisectors of line segments & angles, 60°, 90°, 45° angles etc., equilateral triangles.
2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.
3. Construction of a triangle of given perimeter and base angles.

UNIT V : MENSURATION (Contd.)

2. SURFACE AREAS AND VOLUMES (12) Periods

Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/ cones.

UNIT VI : STATISTICS AND PROBABILITY

1. STATISTICS (13) Periods

Introduction to Statistics : Collection of data, presentation of data — tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons, qualitative analysis of data to choose the correct form of presentation for the collected data. Mean, median, mode of ungrouped data.

2. PROBABILITY (12) Periods

History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real - life situations, and from examples used in the chapter on statistics).

Design of Question Paper
Mathematics (047)
Class IX
S. A. –II (2012-13)

Type of Question	Marks per question	Total no. of Questions	Total Marks
M.C.Q	1	8	8
SA-I	2	6	12
SA-II	3	10	30
LA	4	10	40
TOTAL		34	90

The Question Paper will include value based question(s) to the extent of 3-5 marks

The Question Paper will not have any choice(s) in any of the questions.

Weightage

S.No.	Unit No.	Topic	Weightage
1	II	Algebra (contd.) 3+4 [Linear equations in two variables]	16
2	III	Geometry (contd.) 1+2+4 [Quadrilaterals,Area,Circles,Constructions]	38
3	V	Mensuration 1+3+4	18
4	VI	Statistics & Probability 2+3	18
Total			90

Sample Questions
Mathematics (047)
Class IX
S. A. –II (2012-13)

M.C.Q. 1 Mark

1. If in a quadrilateral, diagonals are equal, then it cannot be a :
   (A) Square (B) Parallelogram (C) Rhombus (D) Rectangle
2. If in a sphere, volume and surface area are numerically equal, then radius will be :
   (A) 1 (B) 3 (C) 2 (D) 4

SA-I 2 Marks

3. In a $\triangle$ ABC, E is the mid-point of median AD. Show that ar (BED) = $\frac{1}{4}$ ar (ABC)
4. Find the mode of 14, 25, 14, 26, 27, 16, 14, 18, 22, 25,26, 30, 14, 25, 22.

SA-II 3 Marks

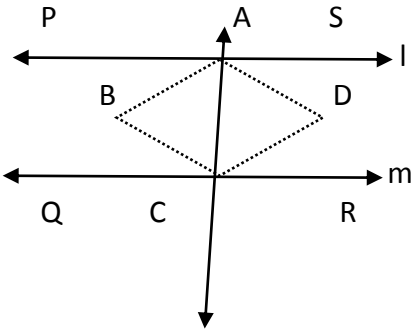
5. The slant height and base diameter of a conical tomb are 25 m and 14m respectively. Find the cost of white – washing its curved surface at the rate of.
6. In a survey, 1000 families with two children were selected randomly and the following data were recorded :

No. of girls in the family	2	1	0
No. of families	320	460	220

   Find the probability of a family, chosen at random, having (i) 2 girls (ii) 1 girl (iii) less than 1 girl.
7. Draw graphs of 3x+2y=0 and 2x-3y=0. What is the point of intersection of the two lines representing the above equation.

LA – 4 Marks

8. A 44m x 11m sheet is roled along length to form a cylinder. Find the volume of the cylinder.
9. Two parallel lines l and m are intersected by a transversal p as shown in the figure. Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.



10. Cost of 7 pens and 8 pencils is Rs. 87 and cost of 6 pens and 4 pencils is Rs. 66. Write linear equations representing the above data and draw its graph. Also find the cost of 1 pen and 1 pencil from the graph.

ANSWER KEY

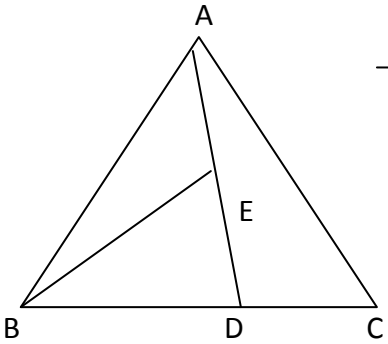
1. (C) 1M
2. (B) 1M
3. Median of a triangle divides it into two triangles of equal area

   In ABC, AD $\triangle$ median $\frac{1}{2}$ M

   . ar (ABD) = ½ ar (ABC) (i) Fig $\frac{1}{2}$ M

   . .

   In $\triangle$ ABD, BE is median



   . ar (BED) = ½ ar (ABD)

   . . $\frac{1}{2}$ M

   = ¼ ar (ABC) using (i)

4. Number 14 occurs most frequently i.e. 4 times 1 M

   so mode = 14 1 M

5. l = slant height = 25 m, r = radius = 7 m

   Area of curved surface of conical tomb = π rl $\frac{1}{2}$ M

   $= \frac{22}{7} \times 7 \times 25$

   $= 550\ m^2$ 1 M

   Cost of white mash @ Rs. 410 per 100 m^2 $= 550 \times \frac{410}{100}$ 1 M

   = Rs. 2255/- $\frac{1}{2}$ M

6. (i) Prob of 2 girls in the family = p(2) = $\frac{320}{1000} = \frac{8}{25}$ 1 M

Prob of 1 girl in the family = p(1) = $\frac{460}{1000} = \frac{23}{50}$ 1 M

Prob of less than 1 girls in the family = p(0) = $\frac{220}{1000} = \frac{11}{50}$ 1 M

7. $3x + 2y = 0$

$Y = -\frac{3x}{2}$

x	0	2	-2
Y	0	-3	3

Graph

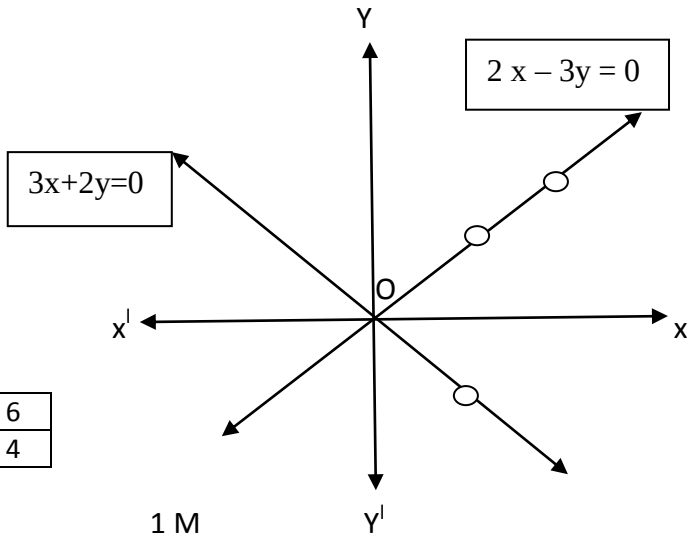
$2x - 3y = 0$ 1 M

$Y = \frac{2x}{3}$

x	0	3	6
Y	0	2	4

Graph 1 M

Point of intersection (o, o)



8. Area of sheet = 44 x 11 m^2

Height of cylinder = length of sheet = 44 m 1 M

Area of cylinder = $2 \pi rh = 2 . \frac{22}{7} r . 44 = 44x11$ 1 M

$r = \frac{7}{4}$ m ½ M

Vol. of cylinder = $\pi r^2 h$

= $\frac{22}{7} . \frac{7}{4} . \frac{7}{4} . 44$ ½ M

= $\frac{1547}{2}$ m^3

= 773.5 m^3 1 M

9. $\angle PAC = \angle ACR$ (alternate angle)

$\frac{1}{2} \angle PAC = \frac{1}{2} \angle ACR$

$\Rightarrow \angle BAC = \angle ACD$ ½ M

But they are alternate angles for lines AB and DC with AC as transversal

So AB ‖ DC 1 M

Similarly BC ‖ AD ½ M

∴ ABCD is a parallelogram

Also ∠ PAC + ∠ CAS = 180˚ (linear pair)

$\frac{1}{2}$ ∠PAC + $\frac{1}{2}$ ∠CAS = 90˚ 1 M

∠ BAC + ∠ CAD = 90˚

∠ BAD = 90˚ ½ M

ABCD is a parallelogram with ∠ A= 90˚

∴ ABCD is a rectangle ½ M

10. Let cost of 1 pen = Rs. x

cost of 1 pencil = Rs. y

7x + 8y = 87

6x + 4y = 66 or 2x + 3y =33 ½

7x + 8y = 87

$Y = \frac{87 - 7x}{8}$

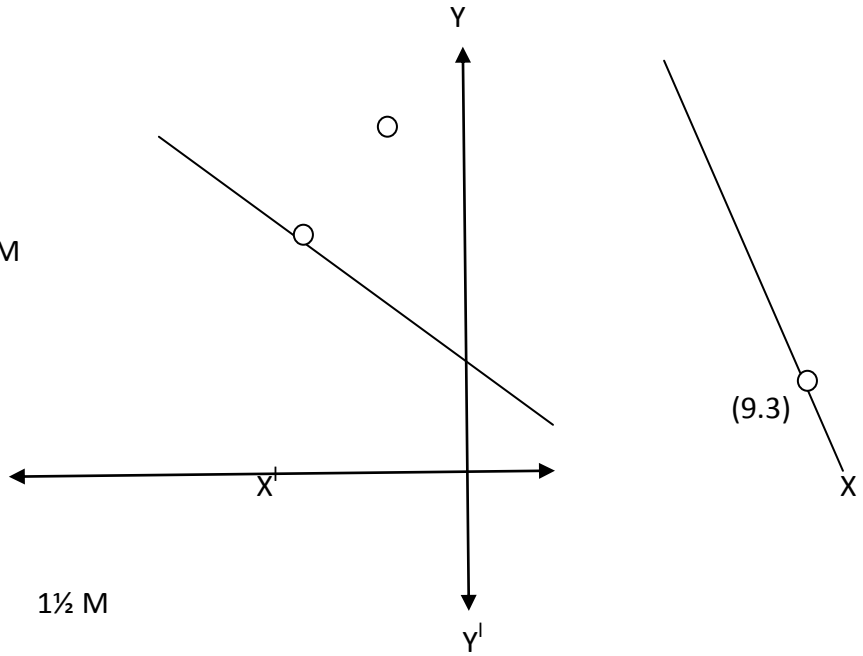
x	3	9
Y	7	3

Graph 1 ½ M

3x + 2y = 33

$y = \frac{33 - 3x}{2}$

x	9	5
Y	3	9



Point of intersection is (9, 3) i.e. 1½ M

Cost of 1 Pen = Rs. 9

Cost of 1 Pencil = Rs. 3 ½ M

VALUE BASED QUESTION

4 Marks

Shimpi, a class IX student received cash award of Rs. 10,000/- (Ten thousand) in the singing competition. Her father advised her to made a budget plan for spending this amount. She made following plan :

Sl. No.	Head	Amount
1	Donation in temple	200
2	Tuition fee to needy child	100
3	Welfare of senior citizens	500
4	Welfare of street children	800
5	Saving in bank	4000
6	Books for family library	2000
7	Picnic for family	1000
8	Gift to grand parents	1100
9	Tea party to friends	300
	Total	**10000**

Make a pie chart for the above data.
From above answer the following question :

1. **Which mathematical concepts have been covered in this?**
2. **How will you rate her budget plan? In your opinion which head has been given (i) more than it deserved and (ii) less than it deserved?**
3. **Which values are depicted in her plan?**

Marking scheme Value BasedQuestion

Sl. No.	Head	Amount	Central angle
1	Donation in temple	200	7.2
2	Tuition fee to needy child	100	3.6
3	Welfare of Senior Citizen	500	18.0
4	Welfare of street children	800	28.8
5	Saving in bank	4000	144.0
6	Books for family library	2000	72.0
7	Picnic for family	1000	36.0
8	Gift to grand parents	1100	39.6
9	Tea party to friends	300	10.8
	Total	**10000**	**360.0**