

LORETO CONVENT SCHOOL  
SUMMATIVE ASSESSMENT –II (2013-2014)

MATHEMATICS

CLASS –IX

TIME ALLOWED: 3Hours to  $3\frac{1}{2}$ Hours.

M.MARKS-100

GENERAL INSTRUCTIONS:

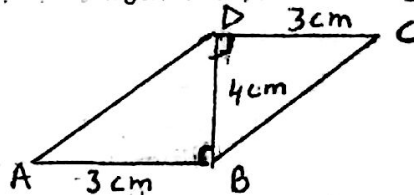
- (i) All questions are compulsory.
- (ii) The question paper consists of 34 questions divided into five sections A,B,C,D and E. Section A comprises of 4 questions of 1 mark each, Section B comprises of 6 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and section D comprises of 11 questions of 4 marks each.
- (iii) Section E is open text book assessment.
- (iv) There is no overall choice.
- (v) Use of calculator is not permitted.
- (vi) Q. No. 27 and 29 to be attempted on the graph sheet.

SECTION A

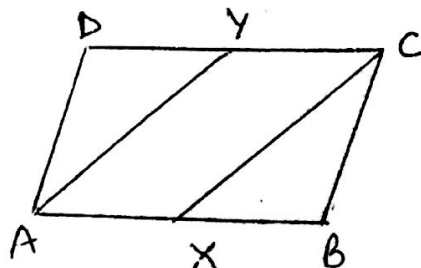
1. The angle of a quadrilateral are respectively  $100^\circ$ ,  $98^\circ$ , and  $92^\circ$ . Find the fourth angle.
2. The cost of a pen is twice the cost of a pencil. Write linear equation in two variables to represent this.
3. The curved surface area of a right circular cylinder of height 14cm is  $88\text{cm}^2$ . Find the radius of the base of the cylinder.
4. Find the mode of 14, 25, 14, 28, 18, 17, 14, 23.

SECTION B

5. The volume of a cube is  $1000\text{cm}^3$ . Find its total surface area.
6. ABCD is a quadrilateral and BD is one of its diagonals as shown in the fig. Show that ABCD is a parallelogram and find its area.



7. Three cubes each of side 5cm are joined end to end. Find the surface area of the resulting cuboid.
8. In the given fig. let ABCD is a parallelogram and X, Y are the midpoints of sides AB and DC respectively. Show that AXCY is a parallelogram.



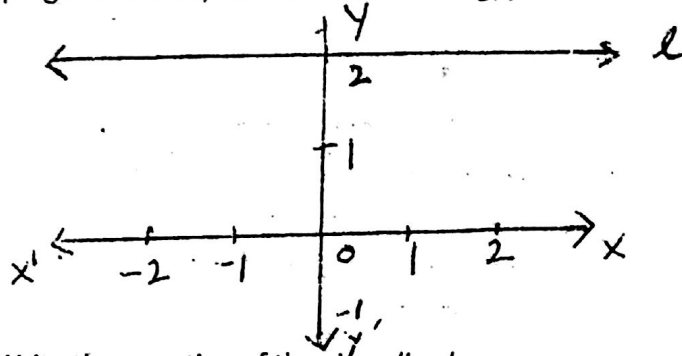
9. The marks obtained by 20 students of class IX in an examination are given below:  
 18, 8, 12, 6, 9, 16, 13, 5, 23, 22, 10, 20, 14, 9, 7, 16, 15, 3, 1, 13.

Present the data in the form of a frequency distribution table using the same class size, one such class being 15-20.

10. Check whether (4, 0) is the solution of the equation  $x - 2y = 4$  or not.

### SECTION C

11. From the graph given below, answer the following question

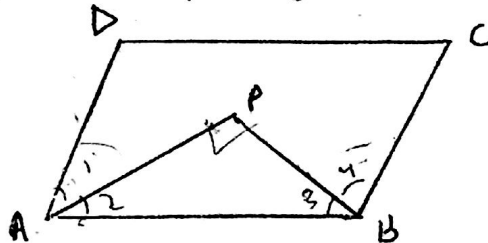


- (i) Write the equation of the given line  $l$ .  
 (ii) Write the coordinates of any two points lying on the line  $l$ .

12. Give the geometrical representation of  $2x + 9 = 0$  as an equation

- (i) in one variable  
 (ii) in two variable

13. In the given fig. let ABCD be a parallelogram. Prove that bisector of  $\angle A$  and  $\angle B$  intersect at right angle.



$$\begin{aligned} 2\angle 2 + 2\angle 3 &= 180^\circ \\ 2\angle 2 + \angle 3 &= 180^\circ \\ \angle 2 + \angle 3 &= 90^\circ \end{aligned}$$

14. ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If  $\angle DBC = 55^\circ$  and  $\angle BAC = 45^\circ$ . Find  $\angle BCD$ .

15. In a Mathematics test given to 16 students the following marks (out of 100) are recorded

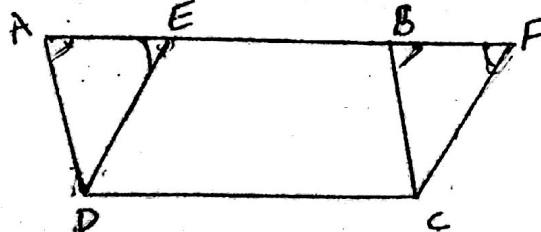
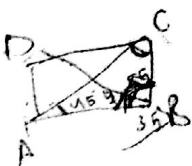
41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60, 65

Find Median of this data

16. Find the value of 'k'; if  $x = 3, y = 3$  is a solution of the equation  $3x + ky = 12$

17. A Metal pipe is 77cm long. The inner diameter of a cross section is 4cm, the outer diameter being 4.4cm. Find the total surface area of the metal used. (Use  $\pi = \frac{22}{7}$ )

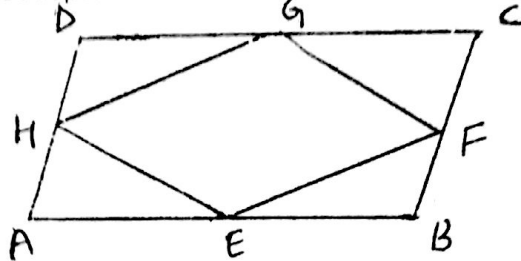
18. Let ABCD and EFCD are two parallelograms on the same base DC and between the same parallels AF and DC. Prove that  $ar(ABCD) = ar(EFCD)$ .



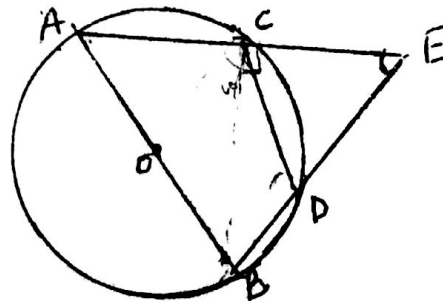
19. In a government hospital a volunteer from an NGO was serving soup in a hemispherical bowl to all 35 patients. If the inner radius of the bowl is 5.6cm, find the total quantity (in ml) of the soup served. Mention any one value shown by the volunteer. (use  $\pi = \frac{22}{7}$ ) 3763
20. The floor of a rectangular hall has a perimeter 250m. If the cost of painting the four walls at the rate of Rs 10 per  $m^2$  is Rs 15000, find the height of the hall.

**SECTION D**

21. If E, F, G and H are respectively the midpoints of the sides of a parallelogram ABCD, show that  $ar(EFGH) = \frac{1}{2} ar(ABCD)$ .



22. Construct a triangle PQR whose perimeter is equal to 14cm  $\angle P=45^\circ$  and  $\angle Q=60^\circ$ .
23. Two coins are tossed simultaneously 500 times, and we get  
 Two heads : 105 times  
 One head : 275 times  
 No head : 120 times  
 Find the probability of occurrence of each of these events.
24. Show that a median of a triangle divides it into two triangles of equal area
25. In the given fig. ,AB is a diameter of the circle ,CD is a chord equal to the radius of the circle, AC and BD when extended intersect at a point E. Prove that  $\angle AED = 60^\circ$



26. If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.
27. The runs scored by team A on the first 30 balls in a cricket match are given below:

Number of balls	Runs
0 - 5	2
5 - 10	10
10 - 15	8
15 - 20	9
20 - 25	4
25 - 30	5

Draw frequency polygon for the given data.

28. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made by recycled card board. Each cone has a base radius 0.2m and height 1m. If the outer side of each of the cones is to be painted and the cost of painting is Rs 12 per  $m^2$ , what will be the cost of painting all the cones. (use  $\pi = 3.14$  and  $\sqrt{1.04} = 1.02$ )

Why do you think recycling and reuse of paper is important? Give any two reasons.

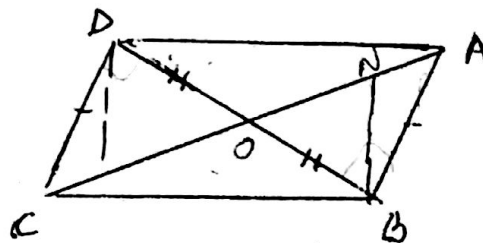
29. Draw a graph of the equation  $x + 2y = 6$

30. Find the mean salary of 60 workers of a factory from the following table:

Salary (in Rs )	Number of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
TOTAL	60

31. In fig diagonals AC and BD of quadrilateral ABCD intersect at O such that  $OB = OD$ . If  $AB = CD$ , then show that:

- (i)  $\text{ar}(\text{DOC}) = \text{ar}(\text{AOB})$   
(ii)  $\text{ar}(\text{DCB}) = \text{ar}(\text{ACB})$



**SECTION E**  
**(OTBA)**

### Theme – Adventure Camp

It was a bright sunny morning when Akash stood in his school's assembly ground, thinking about the adventures he would have in Mukteshwar. Yes, they were going to the much awaited Adventure Camp!

They would live in tents, trek in the forest, spot some flora and fauna, climb the rocks, observe the valleys, perhaps make their own food and what not. Akash just could not stop gushing.

"Hurry up boys, fall in line" said the Principal. The Principal, Dr. Sharma was a man of beliefs and ideals. Taking students out for camps and observing them in the vicinity of nature was his mode of working and re-enforcing appreciation for natural environment among them.

Within no time the teachers and all the students gathered in the ground. Dr. Sharma continued, "You are representing your school in this Adventure Camp. So, behave, act and perform well. Be disciplined and do not harm the nature. I hope you would not let us down. Well, you would go to Mukteshwar by bus. Now, stand in order and move towards your buses."

The students stood in lines – class and section wise. There were exactly 10 students per section. The students lined up as follows.

IX - A	IX - B	IX - C	IX - D	IX - E	IX - F
1	11	21	31	41	51
2	12	22	32	42	52
3	13	23	33	43	53
4	14	24	34	44	54
5	15	25	35	45	55
6	16	26	36	46	56
7	17	27	37	47	57
8	18	28	38	48	58
9	19	29	39	49	59
10	20	30	40	50	60

10 teachers, including Dr. Sharma, were to accompany the students. All moved outside to board the buses. Mrs. Saxena, the coordinating teacher exclaimed, We have got only 4 mini buses; how do I adjust the students? Mr. Singh, the sports teacher, came forward and said, Ma'am, I can see we have 4 buses in which 3 buses are 15 seater and 1 bus is 25 seater. That makes it

$$15 \times 3 + 25 \times 1$$

$$= 45 + 25$$

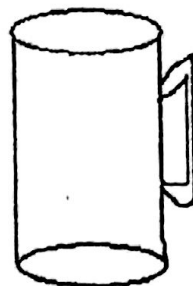
$$= 70 \text{ seats.}$$

So, that should be enough. Mrs. Saxena explained, But Mr. Singh, we need to adjust the students with least disturbance. The criteria is that each bus should have at least

1. Two teachers and
2. Two students of the same section.

Suddenly, Dhruv, a student of IX - C, came up with a plan.

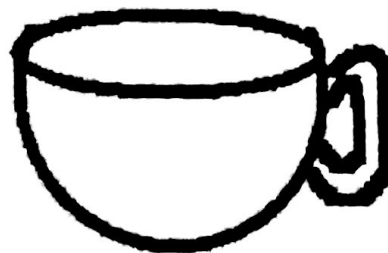
Mrs. Saxena followed the plan and all were happily adjusted. They all set off for the journey and reached Mukteshwar. It was a place brimming with positivity and the scenic beauty was breath-taking. At the camp, the waiters served each student with a welcome drink in a cylindrical glass with the following dimensions:



$$d = 7 \text{ cm}$$

$$h = 10.5 \text{ cm}$$

The drink was two-thirds of the glass. Observing this, the teacher complained to the manager, "Sir, my students have travelled from a far off place. The least they deserve is a full glass of the welcome drink." The manager gently complied but realized that the pantry had only a limited supply of the drink. Quite cleverly, he ordered the waiters to serve the drink in hemispherical cups. The cups looked like the figure shown below



$$d = 7 \text{ cm}$$

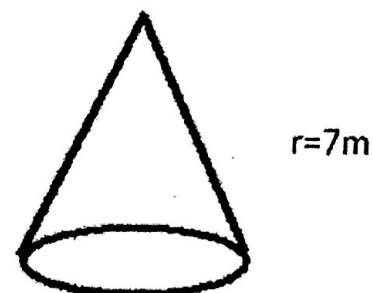
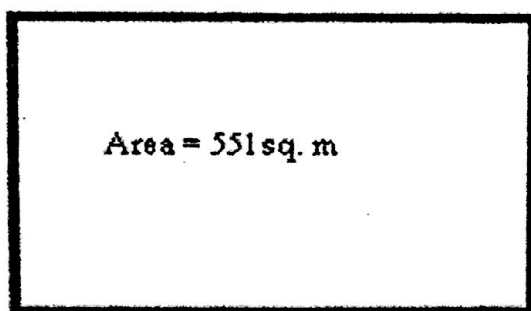
The students looked satisfied, but, Shivam of IX–D sensed the cleverness of the manager and reported it to his teacher. The teacher listened to him patiently but asked him to let go of the matter. Soon the rooms were allotted and they all met in the Conference Hall.

After an hour, they were greeted by Brigadier Tripathi and his team of 50 members who would guide the students and teachers in their camping activities. The students were divided into groups and it was not a difficult task. Within half an hour, the groups reached the camping site, where they would take part in the adventure activities.

The jungle trek was enjoyable but tiring. As dusk fell, it was time to take shelter. But, where was the house? A house in a jungle? Brigadier Tripathi soon came up with a plan.

Each group of four students was given a canvass of area  $551 \text{ m}^2$ . Each group had to make a conical tent to accommodate all the four students. Assuming that all the stitching and wasting incurred while cutting, would amount to  $1 \text{ m}^2$ , the students tried many combinations. Finally, Riya, a student of IX – A came up with a plan. She took the radius of the tent to be 7 m.

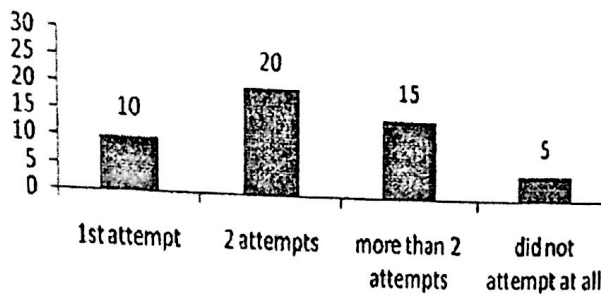
The tent was put up. They all laid down. Suddenly, Swati exclaimed, "The volume of air in the tent seems to be  $1200 \text{ m}^3$ ." Riya said, "No, it is not"



At night, the students sat around the bonfire and presented group plays. With ample security around, the students and teachers all were comfortable and excited to spend the night amidst natural surroundings. At first light, the students were served breakfast and soon they were all raring to go for a rock climbing competition. The group would be declared a winner only if all members would successfully climb the rock. But, the task seemed too difficult. Almost everybody looked surprised. Many students backed out. Soon, Sarah came up with a plan. She took out her pen and paper and set out for something unknown to her friends. After about half an hour, she came back, smiling. "Why are you smiling Sarah? And where were you?" asked Rashi. "Oh, I had gone for a survey. Just wait and watch." With a smile, Sarah asked her group members to gather near her. She whispered something into their ears and showed them her paper. She had asked all the people working with Brig. Tripathi about their performance and success rate in climbing the given rock in their past. Some were successful in the first attempt, while some took more attempts; there were a few who had not tried rock climbing at all. However, they all wanted to try it. The paper had the following table and the following bar graph.

No. of attempts	No of people
1 attempt	10
2 attempts	20
More than 2 attempts	15
Did not attempt at all	05
<b>Total</b>	<b>50</b>

## Success rate in Rock Climbing



Within no time, the group was ready to climb the rock. They all walked with energy and finally Sarah's group managed to win. Brigadier Tripathi asked Sarah about the little talk that she had with her group before the activity. Sarah, the clever girl said that she would tell him on the last day. The days passed with village walks, visit to organic farms, bird watching and river crossing. There were some in-house activities as well. Finally the departure time arrived.

But, all this while, Dr. Sharma was eager to know the answers to some of his questions.

He had never thought that class IX students would come up with such quick and effective solution in critical times. He was getting eager and eager. However, when he got the answers, he realized that he was perhaps, under-estimating his students. They had used such critical situations to bring out their innate qualities.

Who knew that this adventure camp would actually bring out the leaders and the critical thinkers in his students?

Now, referring to the instances and situations listed above, answer the following questions using the mathematical knowledge:

32. (a) If the radius of the conical tent prepared to accommodate 4 students is doubled, then what is the height of the conical tent? Is it possible to make a tent with the given canvas sheet? (3)
- (b) How many conical tents are required to accommodate each group of 4 students? (2)
33. Sarah, showed the survey report of success rate of 50 students climbing the given rock in the past. The new survey report of success rate of 60 students in climbing the given rock is shown below:

No. of attempts	No. of students
1 <sup>st</sup> . attempt	10
2 <sup>nd</sup> .attempt	20
More than 2 attempts	20
Did not attempt at all	10
TOTAL	60

- (a) Draw the bar graph of the above data. (2)
- (b) Determine the percentage of students who climbed on the rock in 1<sup>st</sup> attempt? (2)
34. Is it possible to represent the data shown above by frequency polygon or histogram? Justify. (1)

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