

Manav Mangal

SUMMATIVE ASSESSMENT - 1 (2014-15)
CLASS : X
SUBJECT : MATHEMATICS

Time Allowed : 3 Hours

Max. Marks : 90

Note :

- All questions are compulsory.
- The question paper consists of 31 questions divided into four sections A, B, C and D. 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.
- Question numbers 1 to 4 in Section-A are very short answer type questions to be answered in one sentence or as per exact requirement of the question.
- Use of calculators is not permitted.

Section-A

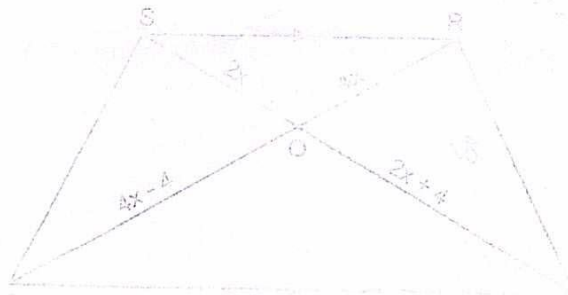
Question numbers 1 to 4 carry 1 mark each.

- The decimal expansion of the rational number $\frac{37}{2^3 5^4}$ will terminate after how many places of decimals ?
- A data has 25 observations arranged in descending order. Which observation represents the median ?
- If zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then find a and b.
- In $\triangle ABC$, if $AB = 6\sqrt{3}cm$, $AC = 12cm$ and $BC = 6cm$, then find the measure of angle B.

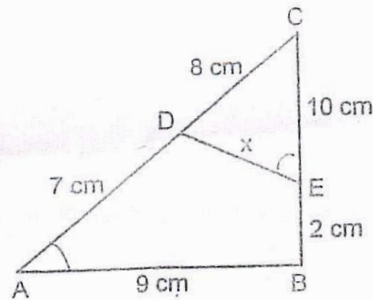
Section-B

Question numbers 5 to 10 carry 2 marks each.

- Find the value(s) of k for which the pair of linear equations $kx + 3y = k - 3$ and $12x + ky = k$ has no solution.
- In the given figure, $PQ \parallel SR$ and $PO : RO = QO : SO$. Find the value of x.



7. If $\tan 2A = \cot(A - 18^\circ)$, where $2A$ is an acute angle, find the value of 'A'.
8. If $\sin(A - B) = \frac{1}{2}$ and $2\cos(A + B) = 1$, find A and B.
9. In the given figure, $\angle CED = \angle CAB$, show that $\triangle CED \sim \triangle CAB$. Also find x.



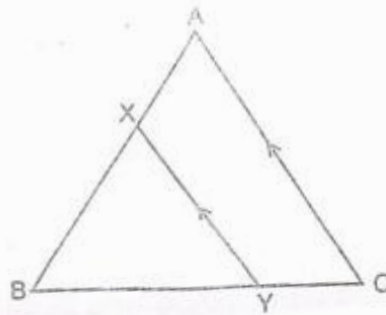
10. Find the mode of the given data :

Class interval	0-20	20-40	40-60	60-80
Frequency	15	6	18	10

Section-C

Question numbers 11 to 20 carry 3 marks each.

11. Prove that $5 - 2\sqrt{3}$ is an irrational number.
12. Gugu and Sukhi take steps of 84cm and 64cm respectively. If they start in step, how far will they walk before they are in step again ?
13. Solve for x and y :
- $$\frac{ax}{b} - \frac{by}{a} = a + b$$
- $$ax - by = 2ab$$
14. If α and β are the zeroes of the polynomial $p(x) = x^2 - 6x + 8$, then form a quadratic polynomial whose zeroes are $\frac{1}{2\alpha}$ and $\frac{1}{2\beta}$.
15. A point O in the interior of a rectangle ABCD is joined with each of the vertices A, B, C and D. Prove that $OA^2 + OC^2 = OB^2 + OD^2$.
16. In the given figure, the line segment XY is parallel to side AC of $\triangle ABC$ and it divides the triangle into two parts of equal areas. Find the ratio $\frac{AX}{AB}$.



17. If $\sin\theta + \cos\theta = p$ and $\operatorname{cosec}\theta + \sec\theta = q$, show that $q(p^2 - 1) = 2p$.
18. Prove that:
- $$(1 + \cot A + \operatorname{cosec} A)(1 + \tan A - \sec A) = 2$$
19. Find the mean of the following frequency distribution using step deviation method.

Classes	0-10	10-20	20-30	30-40	40-50
Frequency	7	10	15	8	10

20. The daily expenditure of 100 families are given below. Calculate f_1 and f_2 if the mean daily expenditure is ₹188.

Expenditure	140-160	160-180	180-200	200-220	220-240
No. of families	5	25	f_1	f_2	5

Section-D

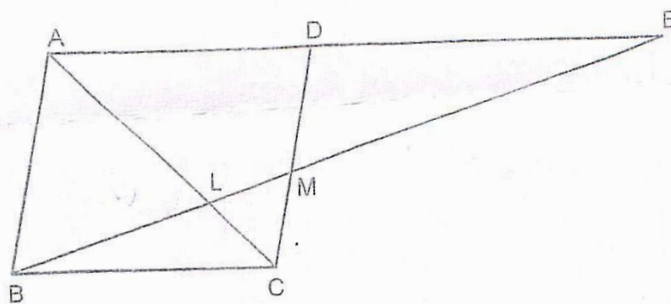
Question numbers 21 to 31 carry 4 marks each.

21. Show that any positive odd integer is of the form $(8q+1)$ or $(8q+3)$ or $(8q+5)$ or $(8q+7)$ where q is same integer.
22. Find other zeroes of the polynomial $(x^4 + x^3 - 9x^2 - 3x + 18)$, if it is given that the two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.
23. Solve the following system of equations graphically and find the vertices of the triangle formed by these lines and y axis:
 $3x + y - 5 = 0$, $2x - y - 5 = 0$
24. A sports teacher has to spend to award 8 students of school for showing merit in Punctuality, Discipline, Honesty, Truthfulness, Sportsman spirit, Team spirit, Sports and Awards of classes of school.

purchases 5 mementos and 8 trophies the amount spent is ₹1612. Find the cost of a memento and a trophy. Which value you prefer the most to be awarded and why?

25. Prove that three times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the medians of the triangle.

26. In the given figure, M is midpoint of side CD of a parallelogram ABCD. The line BM is drawn intersecting AC at L and AD produced at E. Prove that $EL = 2BL$.



27. Prove that:

$$\frac{1}{\sec \theta - \tan \theta} - \frac{1}{\cos \theta} = \frac{1}{\cos \theta} \approx \frac{1}{\sec \theta + \tan \theta}$$

28. Evaluate:

$$\cos(40^\circ - \theta) - \sin(50^\circ + \theta) + \frac{\cos^2 40^\circ + \cos^2 50^\circ}{\sin^2 40^\circ + \sin^2 50^\circ}$$

29. If $\sin \theta + \cos \theta = \sqrt{3}$ then prove that $\tan \theta + \cot \theta = 1$

30. 100 surnames were randomly picked up from a local telephone directory and the distribution of number of letters of the English alphabet in the surnames are obtained as follows:

No. of letters	1-4	4-7	7-10	10-13	13-16	16-19
No. of surnames	6	30	40	16	4	4

Determine the median and mean number of letters in the surnames. Also find the modal size of surnames.

31. During the medical check-up of 35 students of a class, their weights were recorded as follows:

Weight (in Kg) (Less than)	38	40	42	44	46	48	50	52
No. of students	0	3	5	9	14	28	32	35

Draw a less than type ogive for the given data. Hence obtain, the median weight from the graph and verify the result by using the formula.