

SUMMATIVE ASSESSMENT - I, 2015-16
MATHEMATICS
Class - X

Time Allowed: 3 hours

Maximum Marks: 90

General Instructions:

- 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.
- There is no overall choice in this question paper.
- Use of calculator is not permitted.

SECTION-A

Question numbers **1** to **4** carry one mark each

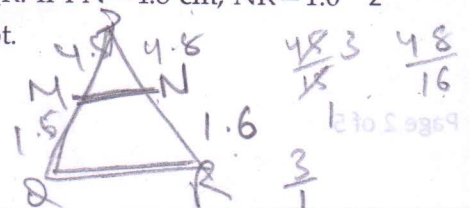
- ✓ In ΔPQR , S and T are points on the sides PQ and PR respectively such that $ST \parallel QR$. If $PS=4$ cm, $PQ=9$ cm and $PR=4.5$ cm, then find PT. 1
- ✓ Find the product of $\cos 30^\circ \cdot \cos 60^\circ \cdot \cos 90^\circ$. 1
- ✓ If $\theta = 45^\circ$, then find the value of $\sec\theta \cdot \cot\theta - \operatorname{cosec}\theta \cdot \tan\theta$. 1
- ✓ Find mode, using an empirical relation, when it is given that mean and median are 10.5 and 9.6 respectively. 1

SECTION-B

Question numbers **5** to **10** carry two marks each.

- ✓ Find the HCF of 90 and 144 by Prime Factorisation method. 2
- 6 Show that any positive odd integer can be written in the form $6m+1$, $6m+3$ or $6m+5$ for some integer m. 2
- ✓ Given the linear equation $3x + 4y = 9$ write another linear equation in these two variables such that the geometrical representation of the pair so formed is : 2
 - intersecting lines
 - coincident lines

8 M and N are points on the sides PQ and PR respectively of a ΔPQR . If $PN=4.8$ cm, $NR=1.6$ cm, $PM=4.5$ cm and $MQ=1.5$ cm, then find whether $MN \parallel QR$ or not.



9 ✓ Prove the following identity :

2

$$\operatorname{cosec} x - \cos^2 x \cdot \operatorname{cosec} x = \sin x$$

10 ✓

2

Data regarding heights of students of Class X of Model school, Dehradun is given below. Calculate the average height of students of the class.

| Height (in cm) | 150-156 | 156-162 | 162-168 | 168-174 | 174-180 |
|--------------------|---------|---------|---------|---------|---------|
| Number of students | 4 | 7 | 15 | 8 | 6 |

SECTION-C

Question numbers 11 to 20 carry three marks each.

11 ✓

Two tankers contain 620 litres and 840 litres of diesel respectively. Find the maximum capacity of a container which can measure the diesel of both the tankers in exact number of times. 3

12 ✓

Given a linear equation $3x - 5y = 11$ form another linear equation in these variables such that the geometric representation of the pair so formed is : 3

(i) intersecting lines

(ii) coincident lines

(iii) parallel lines

13 ✓

Check whether polynomial $x^2 + 2x$ is a factor of the polynomial $x^4 + 2x^3 - x^2 - 2x$, verify by division algorithm. 3

14 ✓

Solve for x and y :

$$2x + y = 6$$

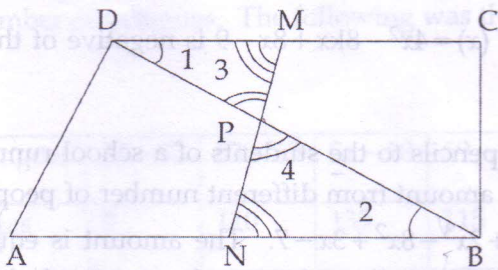
$$2x - y + 2 = 0$$

15 ✓

In a rhombus, prove that four times the square of any side is equal to sum of the squares of its diagonals. 3

16 ✓

Given ABCD is a quadrilateral with $DC \parallel AB$, M and N are the mid points of sides DC and AB prove that $MD \times PB = NB \times PD$. 3



17 Evaluate :
$$\frac{(\tan 60^\circ)^2 + 4 \cos^2 45^\circ + 4 \operatorname{cosec}^2 60^\circ + 2 \cos^2 90^\circ}{2 \operatorname{cosec} 30^\circ + 3 \sec 60^\circ - \frac{7}{3} \cot^2 30^\circ}$$
 3

18 Prove that : 3

$$(\cot \theta - \operatorname{cosec} \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$$

19 The mean of the following distribution is 48 and sum of all the frequencies is 50. Find the missing frequencies x and y . 3

| | | | | | |
|-----------|-------|-------|-------|-------|-------|
| Class | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
| Frequency | 8 | 6 | x | 11 | y |

20 The weights (in kg) of 45 students of a class are given in the following distribution table. Determine the value of weight x which is such that the number of students having weight less than x kg is same as the number of students having weight more than x kg. 3

| | | | | | | |
|---------------------------|----------|----------|----------|----------|----------|----------|
| Weight (in kg) | Below 45 | Below 50 | Below 55 | Below 60 | Below 65 | Below 70 |
| Cumulative frequency (cf) | 5 | 11 | 15 | 22 | 38 | 45 |

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 Find the smallest number that is divisible by first 10 natural numbers. 4

22 In an examination one mark is awarded for every correct answer and $\frac{1}{4}$ mark is deducted for every wrong answer. A student answered 120 questions and got 90 marks. How many questions did he answer correctly? 4

Q. 2
N 3

23 If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx + 8x - 9$ is negative of the other, then find the zeroes of $kx^2 + 3kx + 2$. 4

24 A NGO decided to distribute books and pencils to the students of a school running by some other NGO. For this they collected some amount from different number of people. The total amount collected is represented by $4x^4 + 2x^3 - 8x^2 + 3x - 7$. The amount is equally divided between each of the students. The number of students, who received the amount is represented by $x - 2 + 2x^2$. After distribution, $5x - 11$, amount is left with the NGO which they donated to school for their infrastructure. Find the amount received by each student from the NGO. 4

What value have been depicted here ?

25 "In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle". Prove it. 4

26 In a triangle, if square of one side is equal to sum of squares of other two sides, then prove that the angle opposite to the first side is right angle. 4

Using the above theorem, solve the following : In an isosceles triangle PQR, $PQ = QR$ and $PR^2 = 2PQ^2$, then find $\angle Q$.

27 If $m \cot A = n$, find the value of $\frac{m \sin A - n \cos A}{n \cos A + m \sin A}$ 4

28 Prove that : 4

$$\sqrt{\frac{\sec A + \tan A}{\sec A - \tan A}} \cdot \sqrt{\frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}} = 1$$

29 Prove : 4

$$\left(1 + \frac{1}{\tan^2 A}\right) \cdot \left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$$

30 Draw 'less than type and more than type' ogives for the following distribution : 4

| | | | | | | |
|-----------|-----|------|-------|-------|-------|-------|
| Class | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 |
| Frequency | 3 | 7 | 11 | 25 | 8 | 6 |

Find median from the curves.

31 In a retail market, fruit vendor were selling mangoes in packing boxes. These boxes contained 4

varying number of mangoes. The following was the distribution :

| | | | | | |
|----------------|---------|---------|---------|---------|---------|
| No. of mangoes | 50 - 52 | 53 - 55 | 56 - 58 | 59 - 61 | 62 - 64 |
| No. of boxes | 5 | 110 | 135 | 115 | 25 |

Find the mean and median number of mangoes kept in a packing box.



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