

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

Time Allowed: 3 hours

Maximum Marks: 90

General Instructions:

1. All questions are **compulsory**.
2. 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.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

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

- 1 In $\triangle DEW$, $AB \parallel EW$. If $AD=4$ cm, $DE=12$ cm and $DW=24$ cm, then find the value of DB . 1
- 2 If $24 \cot A = 7$, find the value of $\sin A$. 1
- 3 Find the value of $\tan 15^\circ \cdot \tan 60^\circ \cdot \tan 75^\circ$. 1
- 4 From the following frequency distribution, find the median class : 1

Cost of living index	1400-1550	1550-1700	1700-1850	1850-2000
Number of weeks	8	15	21	8



SECTION-B

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

- 5 Find the least positive integer divisible by first five natural numbers. 2
- 6 What is the condition for the decimal expansion of a rational number to terminate? Explain with the help of an example. 2
- 7 Solve the following pair of linear equations by substitution method : 2
 $3x+2y - 7=0$
 $4x+y - 6=0$
- 8 If one diagonal of a trapezium divides the other diagonal in the ratio $1 : 3$, Prove that one of the parallel sides is three times the other. 2
- 9 Prove that : $(\operatorname{cosec}\theta - \sin\theta)(\sec\theta - \cos\theta) = \cos\theta \cdot \sin\theta$ 2
- 10 The widths of 50 leaves of a plant were measured in mm and their cumulative frequency distribution is shown in the following table. Make an ordinary frequency distribution table for this. 2

Width (in mm)	≥ 20	≥ 30	≥ 40	≥ 50	≥ 60	≥ 70	≥ 80
Cumulative frequency	50	44	28	20	15	7	0

44
28

SECTION-C

Question numbers 11 to 20 carry three marks each.

11 Show that reciprocal of $3+2\sqrt{2}$ is an irrational number. 3

12 The difference of two numbers is 66. If one number is four times the other, find the numbers. 3

13 Find a quadratic polynomial, the sum and product of whose zeroes are -1 and -20 respectively. Hence find the zeroes. 3

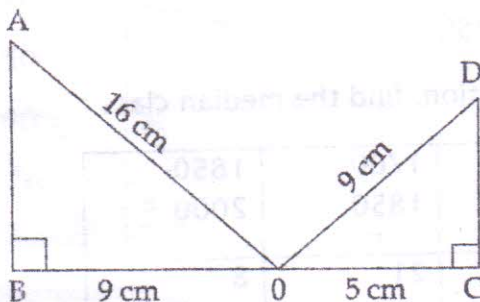
14 Solve the following pair of linear equations by the cross multiplication method : 3

$$X+2y=2$$

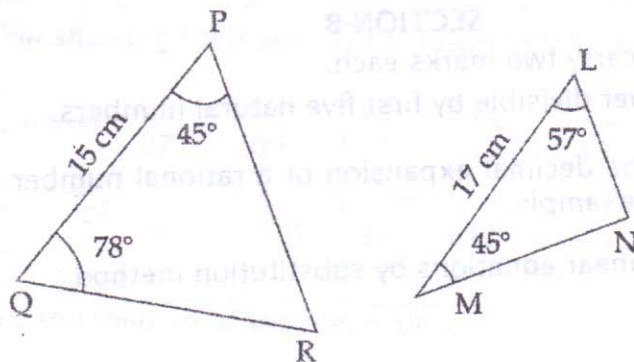
$$X-3y=7$$

15 State whether the given pairs of triangles are similar or not. In case of similarity mention the criterion. 3

(a)



(b)



16 ABC is an isosceles triangle in which $AB=AC$ and $BC^2=2AB^2$. Prove that ABC is a right triangle. 3

17 3

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

18 Prove that : 3

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

$\tan \theta - 2 \sin^2 \theta \tan \theta$

Pocket money (in Rs)	0-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160
Number of students	2	9	12	15	13	10	7	5

Draw a 'less than type' ogive for the above data.

20

Class teacher recorded the following absentee record of 30 students of Class IX for the whole year :

Number of absentees	0-10	10-20	20-30	30-40	40-50
Number of students	10	12	5	2	1

Find the mean and the median for the above data.

SECTION-D

Question numbers 21 to 31 carry four marks each.

21

Can the number 6^n , n being a natural number, end with the digit 5? Give reasons. 4

22

For what values of a and b does the following pair of linear equations have infinite number of solutions? 4

$$2x+3y=7, a(x+y) - b(x - y)=3a+b - 2$$

23

If a polynomial $x^4 - 5x^3 + x^2 + kx = 12$ is exactly divisible by $x^2 - 5x + 4$, then find the value of k . 4

24

Ram's mother has given him money to buy some boxes from the market at the rate of $4x^2 + 3x + 2$. The total amount of money is represented by $8x^4 + 14x^3 - 2x^2 + 7x - 8$. Out of this money he donated some amount to a child who was studying in the light of street lamp. Find how much amount of money he donated and purchased how many boxes from the market? Why Ram did so? 4

25

$\triangle ABC \sim \triangle DEF$ and AX and DY are respectively the medians of $\triangle ABC$ and $\triangle DEF$. Then prove that 4

(i) $\triangle ABX \sim \triangle DEY$

(ii) $\triangle ACX \sim \triangle DFY$

(iii) $\frac{AX}{DY} = \frac{BC}{EF}$

$$\begin{array}{r} 2 \overline{) 100} \\ \underline{2} \\ 50 \\ \underline{5} \\ 25 \\ \underline{3} \\ 5 \\ \underline{5} \\ 1 \end{array}$$

26

Prove that the ratio of the areas of two similar triangles is equal to the ratio of squares of their corresponding sides. 4

Using the above theorem, solve the following: The areas of two similar triangles are 49 cm^2 and 81 cm^2 , find the ratio of their perimeters.

27

Evaluate: 16/9/15

$$\frac{\cos^2 25^\circ + \cos^2 65^\circ}{\sec^2 40^\circ - \cot^2 50^\circ} + \frac{2 \operatorname{cosec}^2 39^\circ - 2 \cot 39^\circ \cdot \tan 51^\circ}{\sin^2 20^\circ + \sin^2 70^\circ}$$

$$- 3 \tan 23^\circ \cdot \tan 33^\circ \cdot \tan 60^\circ \cdot \sin 60^\circ \cdot \tan 67^\circ \cdot \tan 57^\circ.$$

28 If $x = \operatorname{cosec} A + \cos A$ and $y = \operatorname{cosec} A - 2 \cos A$ then prove that

$$\left(\frac{2}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2 = 1$$

29 Prove that: $\frac{(\tan \theta + \sin \theta + 1)(\tan \theta - \sec \theta + 1)}{\tan \theta} = 2$

30 The following distribution shows the survey of height of 50 girls and median is given to be 151.5. Find the missing frequencies.

Height (in cm)	Number of girls
120 - 130	2
130 - 140	f_1
140 - 150	12
150 - 160	f_2
160 - 170	8

31

On annual day of a school, 400 students participated in the function. Frequency distribution showing their ages is as shown in the following table:

Ages (in years)	05-07	07-09	09-11	11-13	13-15	15-17	17-19
Number of students	70	120	32	100	45	28	5

Find mean and median of the above data.

	0°	30°	45°	60°	90°	$\sin^2 \theta + \cos^2 \theta = 1$
$\sin \theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	$1 + \tan^2 \theta = \sec^2 \theta$
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	ND	
$\operatorname{cosec} \theta$	ND	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	
$\sec \theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	ND	
$\cot \theta$	ND	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	