

SUMMATIVE ASSESSMENT - I, 2016-17
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.

LCM 630

$$\frac{126 \times 5}{630}$$

SECTION-A

Question numbers 1 to 4 carry one mark each

- In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $AE = 5.4$ cm, $EC = 3.6$ cm and $AD = 3$ cm, then find BD.
- Evaluate: $\sin^2 19^\circ + \sin^2 71^\circ$.
- If $\sin A = \frac{3}{4}$, find $\operatorname{cosec} A$.
- Find median of the data, using an empirical relation when it is given that mode = 12.4 and mean = 10.5.

$$\frac{12.4 + 10.5 + 12.4}{3} = 11.77$$

SECTION-B

Question numbers 5 to 10 carry two marks each.

- Find whether $5 \times 7 \times 11 \times 13 + 11$ is a prime number or a composite number.
- Without actually performing the long division, state whether the given rational number is terminating decimal expansion or non terminating repeating decimal expansion: $\frac{17}{8}$.
- Find whether the lines representing the following pair of linear equation intersect at a point, are parallel or coincident:
 $\frac{3x}{2} - \frac{5y}{3} = -2$
 $\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$
- ABC is an isosceles triangle right angle at C. Prove that $AB^2 = 2AC^2$.
- Find the value of $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$.

$$\begin{array}{r} 2 \overline{) 90, 126} \\ \underline{5} \\ 45, 63 \\ \underline{3} \\ 9, 63 \\ \underline{3} \\ 3, 63 \\ \underline{3} \\ 0, 63 \\ \underline{3} \\ 3, 63 \\ \underline{3} \\ 0, 63 \\ \underline{3} \\ 0, 0 \end{array}$$

$$2 \times 5 \times 3 \times 3$$

$$2 \times 7 \times 3 \times 3$$

$$2 \times 3 \times 3 \times 7 \times 5$$

The following table shows the daily consumption of milk in 40 houses of a locality:

Consumption (in litres)	0 - 0.5	0.5 - 1	1 - 1.5	1.5 - 2	2 - 2.5
Number of houses	7	15	10	5	3

Find the modal class and median class for the data.

$$\begin{array}{r} 2 \overline{) 90} \\ \underline{5} \\ 45 \\ \underline{3} \\ 9 \\ \underline{3} \\ 3 \\ \underline{3} \\ 0 \end{array}$$

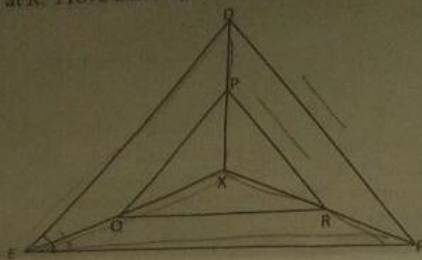
$$\begin{array}{r} 2 \overline{) 126} \\ \underline{7} \\ 63 \\ \underline{3} \\ 9 \\ \underline{3} \\ 3 \\ \underline{3} \\ 0 \end{array}$$

SECTION-C

Question numbers 11 to 20 carry three marks each.

- Find HCF of 90 and 126 by Euclid's division algorithm. Also find their LCM and verify that $LCM \times HCF = \text{Product of two numbers}$.
- On dividing $x^3 - 8x^2 + 20x - 10$ by a polynomial $g(x)$, the quotient and the remainder were $x - 4$ and 5 respectively. Find $g(x)$.
- Find a quadratic polynomial, the sum and product of whose zeroes are 2 and -8 respectively. Hence find the zeroes.
- Find the two numbers whose sum is 75 and difference is 15.

15 X is any point inside a $\triangle DEF$ and is joined to all three vertices. From point P on DX, $PQ \parallel DE$ is drawn which meets EX at Q and from Q, $QR \parallel EF$ is drawn which meets XF at R. Prove that $PR \parallel DF$.



- 16 In $\triangle ABC$, $AB = AC$ and D is a point on side AC such that $BC^2 = AC \times CD$. Prove that $BD = BC$. 3
- 17 Without using trigonometric table, evaluate: 3
- $$\frac{\cos^2 35^\circ + \cos^2 55^\circ}{\operatorname{cosec}^2 15^\circ - \tan^2 75^\circ} + \sqrt{3} (\tan 13^\circ \tan 23^\circ \tan 30^\circ \tan 67^\circ \tan 77^\circ)$$
- 18 Prove that: 3
- $$\frac{\sin \alpha}{1 + \cos \alpha} + \frac{1 + \cos \alpha}{\sin \alpha} = 2 \operatorname{cosec} \alpha$$
- 19 Find the mean of the following frequency distribution by using step deviation method. 3

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	14	24	26	20	16

20 For the following data, find mode: 3

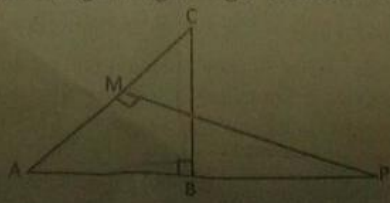
Class	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50
Frequency	12	6	14	8	9

SECTION-D

Question numbers 21 to 31 carry four marks each.

- 21 Prove that $3 + 2\sqrt{5}$ is irrational number. 4
- 22 Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and coefficients. 4
- 23 $3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$ 4
- Solve graphically the pair of linear equations:
 $3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$
 Find the coordinate of the vertices of triangular region formed by these lines and x-axis. Also calculate the area of this triangle.
- 24 Three lines $x + 3y = 6$, $2x - 3y = 12$ and $x = 0$ are enclosing a beautiful triangular park. 4
- Find the points of intersection of the lines graphically and the area of the park, if all measurements are in km. What type of behavior should be expected by public in these type of parks?
- 25 If in the $\triangle ABC$, AD is median and $AM \perp BC$, then prove that 4
- $$AB^2 + AC^2 = 2(AD^2 + BD^2)$$
- 26 In fig. ABC and AMP are two right triangles, right angle at B and M respectively. 4

- Prove that
- $\triangle ABC \sim \triangle AMP$
 - $\frac{CA}{PA} = \frac{BC}{MP}$



Prove that $\frac{1+\tan^2\theta}{1+\cot^2\theta} = \tan^2\theta$

4

If $\tan 2A = \cot (A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .

4

Prove that :

4

$$\frac{\cot\theta + \operatorname{cosec}\theta - 1}{\cot\theta - \operatorname{cosec}\theta + 1} = \frac{1 + \cos\theta}{\sin\theta}$$

The following observations are about the heights of 800 persons. Draw a 'less than type' ogive for the data :

Height (in cm)	135-140	140-145	145-150	150-155	155-160	160-165	165-170	170-175
Number of persons	50	70	80	150	170	100	95	85

31

During an examination, percentages of marks scored by the students are recorded and are shown in the following table :

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	1	3	2	8	20	15	13	25	18	10

Find the mode and median for the above data.

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Handwritten calculations for finding the mode and median:

$$\begin{array}{r} 2 \mid 90, 126 \\ \hline 5 \mid 45, 63 \\ \hline 3 \mid 9, 63 \\ \hline 3 \mid 3, 63 \\ \hline 7 \mid 1, 63 \\ \hline 3 \mid 1, 9 \\ \hline 3 \mid 1, 3 \\ \hline 1, 1 \end{array}$$

$LCH = 63$

$$\begin{array}{r} 126 \\ \times 90 \\ \hline 000 \\ \hline \end{array}$$

$$\sqrt{2 \times 5 \times 3 \times 3 \times 2 \times 3 \times 3}$$

90

7

130

4 4