JSUNIL TUTORIAL
Chase Excellence

SUMMATIVE ASSESSMENT – I, 2016-17
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 the figure, $DE \parallel BC$. If $AD = 2$ cm, $AB = 5$ cm and $AE = 1.5$ cm, find EC.   1
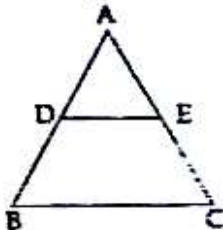
2. Evaluate :   1

$$\frac{\cosec 13°}{\sec 77°} - \frac{\cot 2°}{\tan 7°}$$

3. Write the expression in simplest form : $\sec^2\theta - \dfrac{1}{\cosec^2\theta - 1}$.   1

4. For a certain distribution, mode and median were found to be 1000 and 1250 respectively. Find mean for this distribution, using an empirical relation.   1

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Explain why the number $7 \times 5 \times 3 \times 2 + 3$ is not a prime number ?   2

6. If $\dfrac{241}{4000} = \dfrac{241}{2^m 5^n}$, find the value of m and n. Hence, write its decimal expansion without actual division.   2

7. Find whether the following pair of linear equations is consistent or inconsistent :   2

$y - x = 1$

$x - 3y = 4$

8. Two poles of heights 2 m and 6 m are standing on the ground. If the distance between their feet is 3 m, then find the distance between their tops.   2

9. If $\sec\theta + \tan\theta = p$, show that   2

$$\frac{p^2 - 1}{p^2 + 1} \cosec\theta = 1.$$

10 Given below is a grouped frequency distribution :

Class interval	100-150	150-200	200-250	250-300	300-350	350-400
Frequency	8	15	29	11	17	10

Make a cumulative frequency distribution table of 'less than type' for it.

SECTION-C

Question numbers 11 to 20 carry three marks each.

11 Find LCM and HCF of 3930 and 1800 by prime factorisation method.   3

12 Divide $x^4 - 3x^2 + 4x + 5$ by $x^2 - x + 1$ and then find quotient and remainder.   3

13 If one of the zeros of the quadratic polynomial $(k-1)x^2 + kx + 1$ is 3, then find the value of k.   3
How many zeros can a quadratic polynomial have ?

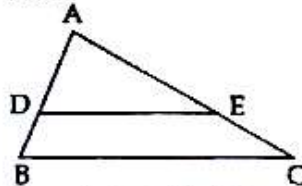**14** Solve the following pair of equations for x and y :   3

$$\frac{4}{x} + 5y = 7$$

$$\frac{3}{x} + 4y = 5$$

15 In the given figure, AB and CD are two pillars. P is a point on BD such that $\overline{BP} = 16$ m and   3
PD = 12 m. If CD = 14 m and AC = 52 m, then find AB and AP, when it is given that
∠APC = 90°.
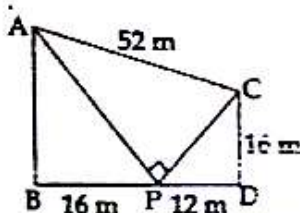
16 In given figure, DE||BC. If AD = 4 cm and DB = 2 cm, find area of △ABC if area of △ADE = 16   3
cm².

17 Given that cos (A + B) = cosA. cosB − sinA. sinB. cosB + cosA. sinB. Find the value of cos 75°.   3

18 Prove that :   3

$$\frac{1 - \sin\theta}{1 + \sin\theta} = (\sec\theta - \tan\theta)^2$$

19 In the following distribution, if mean is 78, find the missing frequency (x) :   3

Class	50-60	60-70	70-80	80-90	90-100
Frequency	8	6	12	11	x

20 An N.G.O. working for welfare of cancer patients, maintained its records as follows -   3

Age of patients (in years)	0-20	20-40	40-60	60-80
Number of patients	35	315	120	50

Find mode.

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m,
9m + 1 or 9m + 8, where m is an integer.

22 Obtain all other zeroes of the polynomial $x^4 + x^3 - 16x^2 - 4x + 48$, if two of its zeroes are 2
and −4.

23. Solve the following system of linear equations graphically :   4

$x - y = 1$

$2x - 5y = -1$

Does the points (2, 1) and (1, 2) lie on any of the lines ?

24. Three lines $x + 3y = 6$, $2x - 3y = 12$ and $x = 0$ are enclosing a beautiful triangular park. Find the   4 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. In a $\triangle ABC$, if $AE \perp BC$ and AD is a median, then prove that   4

$AB^2 + AC^2 = 2(AD^2 + BD^2)$.

26. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of   4 their corresponding medians.

27. If $\theta = 30°$, verify the following :   4

(i) $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

(ii) $\sin 3\theta = 3\sin\theta - 4\sin^3\theta$

28. If $x = \sec A + \sin A$ and $y = \sec A - \sin A$, prove that   4

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

29. Prove that :   4

$$\frac{\sec\theta}{\sec\theta + \tan\theta} + \frac{\tan\theta}{\sec\theta - \tan\theta} = \frac{\sec\theta}{\sec\theta - \tan\theta} - \frac{\tan\theta}{\sec\theta + \tan\theta} = \frac{1 + \sin^2\theta}{1 - \sin^2\theta}$$

30. A school held its sports day in which 150 students participated. Ages of students are given in   4 the following frequency distribution :

Age (in years)	More than or equal to 5	More than or equal to 7	More than or equal to 9	More than or equal to 11	More than or equal to 13	More than or equal to 15	More than or equal to 17
Number of students	150	136	110	85	65	43	15

For above data, draw a 'more than type' ogive and from the curve, find the median. Verify it by actual calculations.

31. Find the median and mode of the following data and then find the mean from the empirical   4 relationship between them :

Class interval	Frequency
0 - 20	6
20 - 40	8
40 - 60	10
60 - 80	12
80 - 100	6
100 - 120	5
120 - 140	3

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