

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

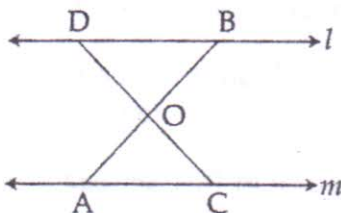
Question numbers 1 to 4 carry one mark each

- 1 ✓ In an isosceles right triangle, if the hypotenuse is $5\sqrt{2}$ cm, then find the length of the sides of the triangle. 1
- 2 ✓ If $1 + \cos^2 \theta = \frac{5}{4}$, find the value of θ . 1
- 3 ✓ If $\sqrt{3} \sin \theta = \cos \theta$, find the value of $\frac{(3\cos^2 \theta + 2\cos \theta)}{(3\cos \theta + 2)}$ 1
- 4 ✓ The mean of the 10 observation is 8.5. If each observation is multiplied by 2, then what is the new mean. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

- 5 ✓ Find HCF of 306 and 657. Also find their LCM using their HCF 2
- 6 ✓ Explain why $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 + 5$ is a composite number? 2
- 7 ✓ A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Abdul paid Rs.30 for a book kept for 6 days while Kaira paid Rs. 45 for a book kept for 9 days. Find the fixed charge and the charge for each extra day. 2
- 8 ✓ In the figure, $l \parallel m$ and AB and CD intersect each other at O. Prove that $\triangle OAC \sim \triangle OBD$. 2



$$\frac{3(\sqrt{3} \sin \theta)^2 + 2\sqrt{3} \sin \theta}{3\sqrt{3} \sin \theta + 2}$$

$$\frac{\sin \theta}{\cos \theta} = \frac{1}{\sqrt{3}}$$

$$9 \sin^2 \theta + 2\sqrt{3} \sin \theta = \frac{24}{72}$$

$$\frac{306}{234} = \frac{108}{108}$$

9

Prove that : $\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \sec\theta \operatorname{cosec}\theta$

10

For the following data, find mode :

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

SECTION-C

Question numbers 11 to 20 carry three marks each.

11 Show that the square of any positive integer is either of the form $4m$ or $4m+1$, for some integer m 3

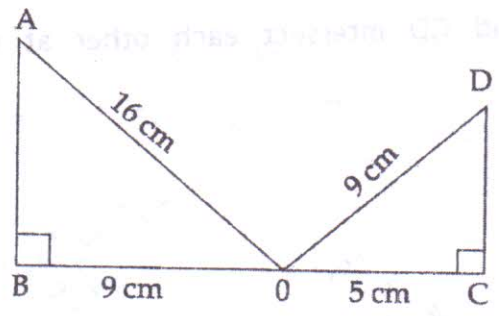
12 Solve for x and y : 3
 $7x - 5y = 2$
 $x + 2y = 3$

13 What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the polynomial ? 3

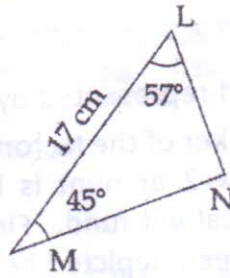
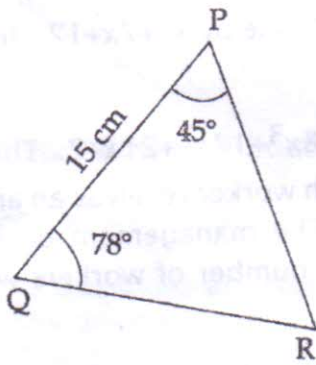
14 Given a linear equation $3x - 5y = 11$ form another linear equation in these variables such that the geometric representation of the pair so formed is : 3
(i) intersecting lines
(ii) coincident lines
(iii) parallel lines

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

(a)



(b)



16 ✓ In a right angled $\triangle ABC$, $\angle B = 90^\circ$. If $\frac{BC}{AB} = \frac{1}{\sqrt{3}}$, then find $\frac{AB}{AC}$. 3

17 ✓ If, $\sin \theta = \frac{12}{13}$ then find the value of : 3

$$\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$$

18 ✓ Prove that : 3

$$\frac{\operatorname{cosec}\theta + \cot\theta}{\operatorname{cosec}\theta - \cot\theta} = 1 + 2 \cot^2 \theta + 2 \operatorname{cosec} \theta \cdot \cot \theta, 0 < \theta < 90^\circ$$

19 ✓ In a street, data was collected on the size of 40 families and it is given below : 3

Family size	0-4	4-8	8-12	12-16	16-20
Number of families	8	14	12	4	2

Find median and mode.

20 ✓ Find the median of the following distribution :

x_i	1	2	3	4	5	6	7	8	9
f_i	8	10	11	16	20	25	15	9	5

SECTION-D

21 ✓ Question numbers 21 to 31 carry four marks each. State Fundamental theorem of arithmetic. 4

Is it possible that HCF and LCM of two numbers be 24 and 540 respectively. Justify your answer.

22 ✓ Mini scored 150 marks in a test getting 3 marks for each correct answer and losing 2 marks for each wrong answer. Had 4 marks been awarded for each correct answer and 1 mark been deducted for each incorrect answer, then she would have scored 250 marks. How many questions were there in the test, if she attempted all the questions. 4

23 If a polynomial $x^4+7x^3+7x^2+px+q$ is exactly divisible by $x^2+7x+12$, then find the value of p and q. 4

24 A factory has a profit fund represented by $6x^4+8x^3+17x^2+21x+7$. The fund is equally divided between each worker of the factory. Each worker receives an amount of $2x^2+5$, while after distribution, $x+2$ amount is left. The management decides to use this amount to create a medical aid fund. Find the number of workers who received the fund. What values have been depicted here? 4

25 Prove that the diagonals of a trapezium intersect each other in the same ratio 4

26 "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

27 If $(\cos\theta+\sin\theta)=\sqrt{2} \sin(90^\circ - \theta)$, show that $(\sin\theta-\cos\theta)=\sqrt{2} \cos\theta$ 4

28 Prove that : 4

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

29 Prove the identity : 4

$$\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \tan\theta + \cot\theta$$

30 A student noted the number of cars passing through a spot on a road for 100 periods each of 2 minutes and compiled data in the following table : 4

Number of cars	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of periods	7	x	13	15	y	10	14	8

Find the missing frequencies x and y, if the mode of the data is given to be 44.

31 The following observations are about the heights of 800 persons. Draw a 'less than type' ogive for the data : 4

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