

NOTES

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9J18ULG

SUMMATIVE ASSESSMENT - I, 2016-17
MATHEMATICS
Class - X

Time Allowed: 3 hours

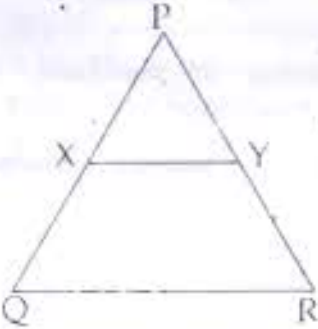
Maximum Marks: 90

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



If in ΔPQR , $XY \parallel QR$, $PX = x - 2$, $XQ = 3x$, $PY = x + 2$ and $YR = 9x$, then find the value of x . 1

Evaluate: 1

$\frac{\tan 15^\circ}{\cot 75^\circ} + \frac{\sin 25^\circ}{\cos 65^\circ}$

Find the value of $\sin^2 \theta + \frac{1}{1 + \tan^2 \theta}$ 1

If mode = 10.6 and median = 11.5, then find mean, using an empirical relation. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

Explain why $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 + 5$ is a composite number? 2

Determine whether the $\frac{7^{86}}{1500}$ has a terminating decimal expansion or non-terminating repeating decimal expansion. 2

Given the linear equation $3x - 4y - 7 = 0$, write another linear equation in these two 2

variables such that the geometrical representation of the pair so formed is :

- (i) intersecting lines (ii) parallel lines

In ΔABC , if $AP \perp BC$ and $AC^2 = BC^2 - AB^2$, then prove that $PA^2 = PB \times CP$

Simplify :

$$\frac{1 + \tan^2 A}{1 + \cot^2 A}$$

Following distribution gives cumulative frequencies of 'more than type' :

Marks obtained	More than or equal to		More than or equal to		More than or equal to		More than or equal to	
	5	10	15	20	25	30	35	40
Number of students (cumulative frequency)	30	23	8	2				

Change the above data to a continuous grouped frequency distribution

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 $3m$ or $3m+1$ for some integer m . 3

12 On dividing $x^3 - x^2 - 3x^2 + 3x + 2$ by a polynomial $g(x)$, the quotient and the remainder were $x^2 - x - 2$ and $2x$ respectively. Find $g(x)$. 3

13 If α and β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k . 3

14 Solve for x and y :

$$\frac{5}{x-1} + \frac{1}{y-2} = 2$$

$$\frac{6}{x-1} - \frac{3}{y-2} = 1$$

15 If ABC is an obtuse angled triangle, obtuse angled at B . If $AD \perp CB$ (produced) such that AD meets CB (produced) at D , prove that $AC^2 = CB^2 + AB^2 + 2BC \times BD$ 3

16 Prove that area of the equilateral triangle described on the side of a square is half of the area of the equilateral triangle described on its diagonal. 3

17 Evaluate : $\sin 35^\circ \cos 55^\circ + \cos 35^\circ \sin 55^\circ - 2 \operatorname{cosec} 43^\circ \cos 47^\circ$
 $\tan 15^\circ \tan 25^\circ \tan 60^\circ \tan 75^\circ \tan 65^\circ$ 3

18 $\sin^2 \theta \tan \theta + \cos^2 \theta \cot \theta + 2 \sin \theta \cos \theta = \tan \theta + \cot \theta$ 3

19 Monthly household expenditures of families in a society are given in the following table : 3

Monthly expenditures (in ₹)	2000-3000	3000-4000	4000-5000	5000-6000	6000-7000
No. of families	3	7	12	14	4

Find the mean monthly expenditure.

20 The following data gives information on the observed life time (in hours) of 250 electrical components :

Life time (In hours)	0 - 20	20 - 40	40 - 60
No. of components	30	36	52
Life time (In hours)	60 - 80	80 - 100	100 - 120
No. of components	61	38	33

$\frac{a_1}{a_1} + \frac{b_1}{b_1}$

Determine the modal life time of the component.

SECTION-D

Question numbers 21 to 31 carry four marks each.

- 21 Write the HCF and LCM of the smallest odd composite number and the smallest odd prime number. If an odd no. p divides q^2 then will it divide q^3 also? Explain. 4
- 22 Obtain all other zeroes of the polynomial $x^4 + 3x^3 - 3x^2 - 15x - 10$, if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$. 4
- 23 Draw the graph of the following pair of linear equations :
 $x + 3y = 6$ and $2x - 3y = 12$ 4
 Find the ratio of the areas of the two triangles formed by first line, $x=0, y=0$ and second line $x=0, y=0$
- 24 The incomes of two persons A and B are in the ratio 8 : 7 and the ratio of their expenditures is 19 : 16. If their savings are ₹ 2550 per month, find their monthly incomes. 4
 What is the importance of saving in life?
- 25 If AD, BE and CF are medians of the ΔABC , then prove that 4
 $3(AB^2 + BC^2 + CA^2) = 4(AD^2 + BE^2 + CF^2)$.
- 26 In ΔABC , from A and B altitudes AD and BE are drawn. Prove that $\Delta ADC \sim \Delta BEC$. Is $\Delta ADB \sim \Delta AEB$ and $\Delta ADB \sim \Delta ADC$? 4
- 27 Calculate the trigonometric ratios of 60° with the help of an equilateral triangle. 4
- 28 If $\tan A + \sin A = m$ and $\tan A - \sin A = n$, then prove that 4
 $(m^2 - n^2)^2 = 16mn$.
- 29 Prove that : 4

$$\frac{\sin A}{1 + \cos A} + \frac{\sin A}{1 - \cos A} = \frac{1 + \cos A}{\sqrt{1 - \cos A}} + \frac{1 - \cos A}{\sqrt{1 + \cos A}} = 2 \operatorname{cosec} A$$

30 The following are the ages of 200 patients getting medical treatment in a hospital on a particular day : 4

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of Patients	40	22	35	50	23	30

Write the above distribution as less than type cumulative frequency distribution and also draw an ogive to find the median.

31 Ages of 120 patients admitted in a hospital are given in the following distribution. If mean of the distribution is 26, find the missing frequencies x and y . 4

Age of patients (in years)	0-8	8-16	16-24	24-32	32-40	40-48
Number of patients	20	x	8	y	30	20