

NGPS NewKanthu

SUMMATIVE ASSESSMENT - 1, 2015-16 *Guerrilla Singh* 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.

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. 1

2. Find the value of $\tan(65^\circ - \theta) - \cot(25^\circ + \theta)$. 1

✓ If A and B are acute angles of a right angled triangle ABC such that $\sin A = \cos B$, find the value of $A + B$. 1

✓ In the following distribution, find upper limit of median class : 1

Class interval	0 - 8	8 - 16	16 - 24	24 - 32	32 - 40	40 - 48
Frequency	7	9	10	8	12	8

SECTION-B

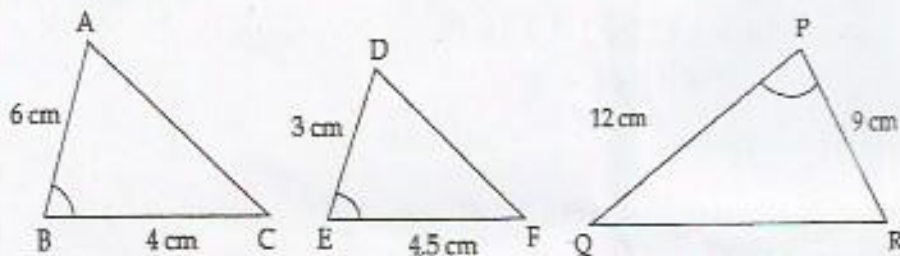
Question numbers 5 to 10 carry two marks each.

✓ Write the decimal expansion of $\frac{1717}{2^2 \times 5^3}$ without actual division. 2

✓ State Euclid division lemma. If Euclid lemma is used for a = b q + r, then which of a, b, q, or r is necessarily zero. 2

✓ A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Abdul paid ₹ 30 for a book kept for 6 days while Kaira paid ₹ 45 for a book kept for 9 days. Find the fixed charge and the charge for each extra day. 2

8. State which of the two triangles given in the figure are similar. Also state the similarity criterion used.



9. Prove that: $(1 + \tan^2\theta)(1 + \sin\theta)(1 - \sin\theta) = 1$

10. Data regarding weights of students of Class X of a school is given below. Calculate the average (mean) weight of the students.

Weight (in kg)	50-52	52-54	54-56	56-58	58-60	60-62	62-64
Number of students	18	21	17	28	16	35	15

SECTION-C

Question numbers 11 to 20 carry three marks each.

11. Prove that $\frac{3\sqrt{2}}{4}$ is an irrational number.

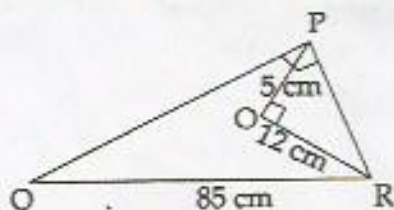
12. A part of monthly Hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay ₹ 3000 as hostel charges whereas Mansi who takes food for 25 days pays ₹ 3500 as hostel charges. Find the fixed charges and the cost of food per day.

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 .

14. $2x = 5y + 4$ is given. Write another linear equation, so that the lines represented by the pair are:
 (i) intersecting $\Rightarrow 5x = 7y + 3$
 (ii) coincident $4x = 10y + 8$
 (iii) parallel $4x = 10y + 17$

15. In $\triangle ABC$, P and Q are the middle points of AB and AC. Prove that $PQ \parallel BC$.

16. In given figure, $OP = 5$ cm, $OR = 12$ cm and $QR = 85$ cm find the area of $\triangle PQR$.



Find the value of $\tan 30^\circ$ geometrically.

3

18 Evaluate :

3

$$\operatorname{cosec} 39^\circ \cdot \cos 51^\circ + \tan 21^\circ \cdot \cot 69^\circ - \sec^2 21^\circ$$

19 In a housing complex, local directory of residents was printed. Frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows :

Number of letters	0-3	3-6	6-9	9-12	12-15	15-18
Number of surnames	10	30	50	5	3	2

Determine the median number of letters in the surnames.

20 Draw a 'less than type' ogive for the following frequency distribution :

3

Class	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	13	18	31	25	15	5

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 A wholesale merchant purchases three types of fertilizer weighing 825 kg, 675 kg and 450 kg respectively. Find the maximum weight that can measure the three types of fertilizers exact number of times.

4

Solve the following system of linear equations graphically :

4

$$5x - 7y = -50$$

$$5x + 7y = 20$$

Also write the coordinates of the points where they meet x-axis. Shade the triangular region.

22 Divide polynomial $x^4 - 6x^3 + 8x^2 + 5x - 7$ by $x - 1$ and find quotient and remainder. Also verify the division algorithm.

4

24 Government of India allotted relief fund to help the families of flood affected village. The fund is represented by $4x^3 + 8x^2 + 7$. The fund is equally divided between each of the families of that village. Each family received an amount of $x^2 - 2$. After distribution, some amount was left. The District Magistrate decided to use this amount to open a school in that village. Find the number of families which received relief fund from Government, and the left amount.

4

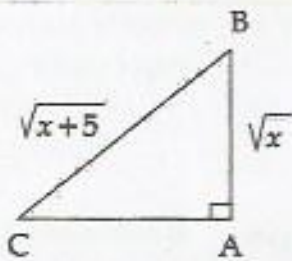
What is the importance of such relief funds ?

25 State and prove Basic Proportionality Theorem.

4

26 In $\triangle ABC$, from A and B altitudes AD and BE are drawn. Prove that $\triangle ADC \sim \triangle BEC$. Is $\triangle ADB \sim \triangle AEB$ and $\triangle ADB \sim \triangle ADC$?

4



In the $\triangle ABC$ (see figure), $\angle A = \text{right angle}$, $AB = \sqrt{x}$ and $BC = \sqrt{x+5}$.

Evaluate :

$$\sin C \cdot \cos C \cdot \tan C + \cos^2 C \cdot \sin A$$

28 If $\operatorname{cosec} A - \cot A = q$, then show that $\frac{q^2 - 1}{q^2 + 1} + \cos A = 0$.

29 If $\cos \theta = \frac{3}{5}$, find the value of $\left(\frac{5 \operatorname{cosec} \theta - 4 \tan \theta}{\sec \theta + \cot \theta} \right)$.

30 Find the mode of the following frequency distribution

Class interval	f
25 - 35	7
35 - 45	31
45 - 55	33
55 - 65	17
65 - 75	11
75 - 85	1

31 If mode of the following data is 32.5 and sum of frequencies is 70, then find the missing frequencies x and y :

Class	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	x	22	y	8	7	3	2

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