

SUMMATIVE ASSESSMENT - I, 2016 -17 MATHEMATICS - Class - X Question paper – 3 [Code: VTZCUON]

Time Allowed: 3 hours

Maximum Marks: 90

SECTION – A

1. If Three sides of a triangle are 60 m, 50 in and 120 in. Are these sides of a right angled triangle
2. In ABC , Right angled at C, if $3 \cot A=4$, find the value of Sin B ?
3. What happens to value of $\tan \theta$ when θ increases form 0° to 90° ?
4. Find the sum of upper limit and lower limit of the class interval in which the 20th observation of the following data lies :

| | | | | | | | |
|----------------|---------|-----------|-----------|-----------|----------|----------|-----------|
| Class interval | 0 — 100 | 100 — 200 | 200 — 300 | 300 — 400 | 400- 500 | 500— 600 | 600 — 700 |
| Frequency | 5 | 7 | 6 | 3 | 20 | 4 | 8 |

SECTION - B

5. Use Euclid's division algorithm to find HCF of 130 and 225
6. Show that $5 - 2\sqrt{3}$ is an irrational number.
7. Solve the following pair of linear equations: $6x - y = 5$ $3x + 2y = - 5$
8. In ΔABC , $\angle A=90^\circ$, $AN \perp BC$, $BC = 13$ cm and $AC = 5$ cm. Find the ratio ar (ΔNAC) : ar (ΔABC).
9. Evaluate: $\frac{3 \sin 20^\circ}{2 \cos 70^\circ} - \frac{\sin 30^\circ \tan 70^\circ}{\cot 20^\circ}$
10. Calculate the mean of the following distribution:

| | | | | | |
|---------------|--------|---------|---------|---------|---------|
| Class interne | 5 - 20 | 20 - 35 | 35 - 50 | 50 - 45 | 65 - 80 |
| Frequency | 7 | 8 | 12 | 13 | 10 |

SECTION – C

11. The length, breadth and height of a room are 8 in 50 cm , 6 m 25 cm and 4 m 75 an 3 respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.

12. Solve the following pair of linear equations by method of cross multiplication

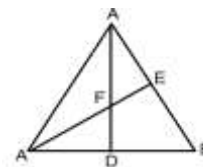
$$\frac{b}{a}x + \frac{a}{b}y = a^2 + b^2 \text{ and } x + y = 2ab$$

13. Divide the polynomial $6x^4 - 44x^2 + 6x - 3$ by the polynomial $x^2 - 3x + 1$ and verify the division algorithm.

14. Solve the following pair of equations: $49x + 51y = 499$ and $51x + 49y = 501$

15. In a rhombus, prove that four times the square of any side is equal to sum of the Square of its diagonals.

16. In given figure, altitudes AE and CD intersect at F. Prove that (i) $\Delta ADF \sim \Delta CEF$ (ii) $AD \times EF = DF \times CE$



17. Evaluate : $(\sec \theta \operatorname{cosec} (90 - \theta) - \tan \theta \cot(90 - \theta) + \sin^2 55^\circ + \sin^2 35^\circ) / (\tan 10^\circ \tan 20^\circ \tan 60^\circ \tan 70^\circ \tan 80^\circ)$

18. Prove that : $(1 + \tan A + \cot A) \cdot (\sin A - \cos A) = \sin A \cdot \tan A - \cot A \cdot \cos A$

19. Following table gives the number of participants in a yoga camp. Find the modal age of participants.

| | | | | | |
|------------------------|---------|---------|--------|-------|-------|
| Age (in yrs) | 20 - 30 | 30 - 40 | 40- 50 | 50-60 | 60-70 |
| Number of participants | 8 | 40 | 58 | 90 | 83 |

20. The following data shows the number of toys in a group of 30 children. Find the median number of toys with a child.

| | | | | |
|--------------------|-------|-------|-------|-------|
| Number of toys | 0 - 2 | 2 - 4 | 4 - 6 | 6 - 8 |
| Number of children | 1 | 10 | 12 | 7 |

SECTION - D

21. Find the smallest number that is divisible by first 10 natural number

22. The area of a rectangle reduces by 160 m^2 if its length is increased by 5 m and breadth is reduced by 4m. However if length is decreased by 10 m and breadth is increased by 2 m, then its area is decreased by 100 m^2 . Find the dimensions of the rectangle.

23. Find all the zeroes of the polynomial $x^4 - 3x^3 + 6x - 4$, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$

24. In the North - East of India a village was affected by flood. Mr. Sharma from Mumbai decided to help them with food items, clothes, medicine etc. so, he collected some amount from different persons, which is represented by $4x^4 + 2x^3 - 8x^2 + ax + b$, If $2x^2 + x - 2$ was number of persons who were helped by this service and left over amount was $5x - 11$, which was donated in Prime Minister Relief Fund, then find the value of a and b. What values are possessed by Mr. Sharma?

25. Prove that in a right triangle, the square on the hypotenuse is equal to sum of square of other two sides. Using the above result, prove that : ΔABC , if AD is the perpendicular to BC, then $AB^2 + CD^2 = AC^2 + BD^2$.

26. If two poles 5 m and 15 in high are 100 m apart, then find the height of the point of intersection of the line joining the top of each pole to the foot of the opposite pole .

27. Find $\operatorname{cosec}30^\circ$ and $\tan60^\circ$ geometrically.

28. If $m = \operatorname{cosec} A - \sin A$ and $n = \sec A - \cos A$, prove that $(m^2 n)^{\frac{2}{3}} + (mn^2)^{\frac{2}{3}} = 1$

29. Prove that : $\frac{\tan^3 \theta}{1 + \tan^2 \theta} + \frac{\operatorname{cat}^3 \theta}{1 + \operatorname{cat}^2 \theta} = \sec \theta \operatorname{cosec} \theta - 2 \sin \theta \cos \theta$

30 The following table gives the daily income of 50 workers of a factory. Draw both types (less than type' and "greate - ogives

| | | | | | |
|-------------------|----------|---------|----------|----------|-----------|
| Daily income (r) | 100 -120 | 120-140 | 140 -160 | 160 -180 | 180 - 200 |
| Number of workers | 12 | 14 | 8 | 6 | 10 |

31 Following frequency distribution shows the ages of 560 girls at the time of their marriage in a city. If mode age of the data is 24 years, find the missing frequencies x and y.

| | | | | | | | | |
|-----------------|---------|---------|---------|-------|---------|--------|---------|--|
| Age (in years) | 18 - 23 | 23 - 28 | 28 - 33 | 33-38 | 38 - 43 | 43 -48 | 48 - 53 | |
| Number of girls | x | 170 | y | 50 | 38 | 10 | 2 | |