

AMRITA VIDYALAYAM

AMRITA PRE BOARD EXAMINATION 1 - 2018 - '19

Class : X

Marks : 80

Time : 3 hrs

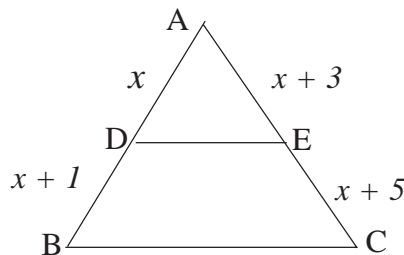
MATHEMATICS

GENERAL INSTRUCTIONS:

1. All questions are compulsory.
2. This question paper consists of 30 questions divided into four sections; A, B, C and D.
3. Section A consists of 6 questions of 1 mark each, Section B consists of 6 questions of 2 marks each, Section C consists of 10 questions of 3 marks each and Section D consists of 8 questions of 4 marks each.

SECTION - A

1. Write whether the rational number $7/75$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion.
2. If the distance between the points $(4, k)$ and $(1, 0)$ is 5, then what can be the possible values of k ?
3. For a certain distribution, mode and median were found to be 1000 and 1250 respectively. Find mean for this distribution, using an empirical relation.
4. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting a king of red colour.
5. Find the first 4 terms of an A.P. whose first term is -2 and common difference is -3.
6. In $\triangle ABC$, $DE \parallel BC$, Find the value of x .



SECTION - B

7. Prove that the points $(3, 0)$, $(6, 4)$ and $(-1, 3)$ are the vertices of a right angled isosceles triangle.
8. Using Euclid's algorithm find the HCF of 240 and 228.
9. For the following data, find mode.

| | | | | | |
|-----------------|-------|-------|-------|-------|--------|
| Class intervals | 1 - 3 | 3 - 5 | 5 - 7 | 7 - 9 | 9 - 11 |
| Frequency | 14 | 16 | 4 | 4 | 2 |

10. Evaluate. $\frac{\operatorname{Cosec} 13^\circ}{\operatorname{Sec} 77^\circ} - \frac{\operatorname{Cot} 20^\circ}{\tan 70^\circ}$
11. How many terms of the A.P. 9, 17, 25, must be taken to give a sum of 636?
12. A box contains cards numbered 11 to 123. A card is drawn at random from the box. Find the probability that the number on the card drawn is
 - a) a square number.
 - b) a multiple of 7.

SECTION - C

13. For what value of k , are the roots of the quadratic equation $(k - 4)x^2 + (k - 4)x + 4 = 0$ equal?
14. Prove that $(\cot q - \operatorname{cosec} q)^2 = \frac{1 - \cos q}{1 + \cos q}$
15. If α and β are the zeroes of the polynomial $6y^2 - 7y + 2$, find a quadratic polynomial whose zeroes are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.
16. Prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.
17. The angles of depression of the top and bottom of a 50m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building ($\sqrt{3} = 1.73$)

OR

A 7m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From a point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower. ($\sqrt{3} = 1.73$)

18. Solve using cross - multiplication method.

$$\begin{aligned} 2x + y &= 5 \\ 3x + 2y &= 8 \end{aligned}$$

OR

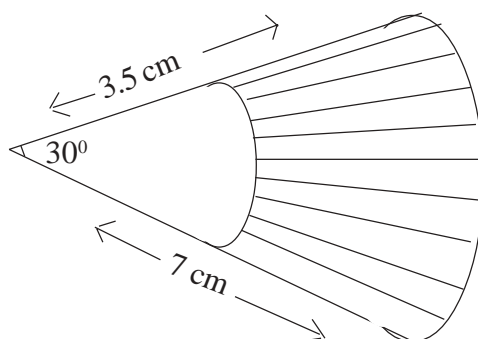
A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

19. Prove that $\sqrt{3}$ is an irrational number.
20. Find the co-ordinate of a point P on the line segment joining A (1, 2) and B (6, 1) such that $AP = \frac{2}{5} AB$.

OR

Find the ratio in which the line segment joining the points A (3, -3) and B (-2, 7) is divided by the x -axis. Also find the co-ordinates of point of division.

21. Sectors of two concentric circle of radii 7 cm and 3.5 cm are given. Find the area of shaded region. ($\pi = \frac{22}{7}$)



22. A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and the slant height is 15 cm, find the area of material required for making it. ($\pi = \frac{22}{7}$)

OR

A circular cone of radius 3cm, has a curved surface area of 47.1 cm^2 . Find the volume of the cone. ($\pi = 3.14$)

SECTION - D

23. xy and x^1y^1 are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting xy at A and x^1y^1 at B . Prove that $\angle AOB = 90^\circ$.
24. Show that in a right triangle, the square of the hypotenuse is equal to sum of the squares of the other 2 sides.

OR

The perpendicular from A on side BC of $\triangle ABC$ intersects BC at D , such that $DB = 3 CD$. Prove that $2AB^2 = 2AC^2 + BC^2$.

25. The sum of the ages of a boy and his brother is 25 years and the product of their ages (in years) is 126. Find their present ages?
26. Construct a triangle ABC with $BC = 7\text{cm}$, $\angle B = 60^\circ$ and $AB = 6\text{ cm}$. Construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of $\triangle ABC$.
27. Prove that $\left[\frac{1 + \tan^2 A}{1 + \cot^2 A} \right] = \left[\frac{1 - \tan A}{1 - \cot A} \right]^2 = \tan^2 A$

28. Solve.
- $$\frac{11}{x} - \frac{1}{y} = 10$$
- $$\frac{9}{x} - \frac{4}{y} = 5$$

OR

A boat takes 4 hours to go 44 km downstream and it can go 20 km upstream in the same time. Find the speed of the stream and that of the boat in still water.

29. Water in a canal, 6m wide and 1.5 m deep is flowing with a speed of 10 km / h. How much area will it irrigate in 30 minutes, if 8 m of standing water is needed?
30. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹ 18. Find the missing frequency K ?

| | | | | | | | |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|
| Daily pocket allowance (₹) | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
| Number of children | 3 | 6 | 9 | 13 | K | 5 | 4 |

OR

The following table shows the weight of 120 articles.

| | | | | | | |
|--------------------|------|-------|-------|---------|---------|---------|
| Weight (in kg) | 0-10 | 10-20 | 20-30 | 30 - 40 | 40 - 50 | 50 - 60 |
| Number of articles | 14 | 17 | 22 | 26 | 23 | 18 |

Change the distribution to a more than type distribution and draw its ogive.