AMRITA VIDYALAYAM

HALF YEARLY EXAMINATION 2018 - '19

Class : X **Marks : 80**

Time : 3 hrs

MATHEMATICS

GENERAL INSTRUCTIONS:

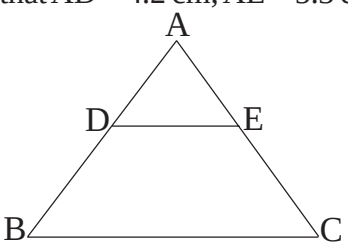
1. All questions are compulsory.

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

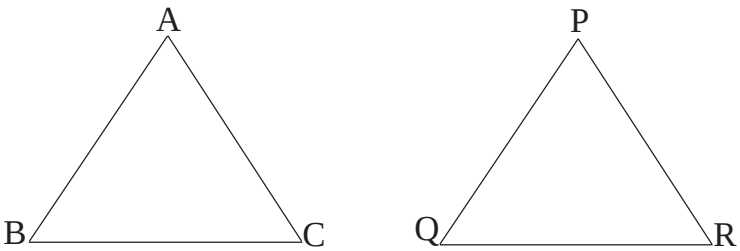
1. Find the n^{th} term of an AP, whose first term is a and common difference is 'd'.
2. The mean of the number 6, y, 7, x and 14 is 8. Express y in terms of x.
3. In the figure DE || BC. Such that AD = 4.2 cm, AE = 5.3 cm and EC = 7.5 cm, find DB.



4. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel then find the value of K.
5. State Euclid's division lemma.
6. Show that $3x + 2$ is a factor of $3x^2 - x - 2$.

SECTION - B

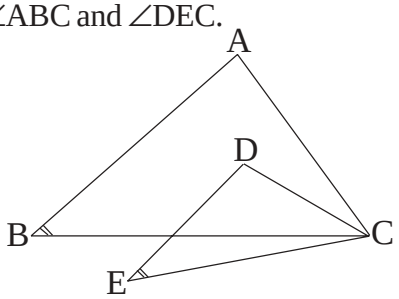
7. Find the value of 'a', if the division of $ax^3 + 9x^2 + 4x - 10$ by $x + 3$ leaves a remainder 5.
8. If $\frac{241}{4000} = \frac{241}{2^m 5^n}$. Find the values of 'm' and 'n'. Where 'm' and 'n' are non-negative integers.
9. The two similar triangles are equal in area. Prove that the triangles are congruent.



10. How many multiples of 4 lie between 10 and 250?
11. Solve the following pair of linear equations by substitution method.
    $x - 7y + 42 = 0$
    $x - 3y - 6 = 0$
12. Find mode using an empirical relation when it is given that mean and median are 12.5 and 9.8 respectively.

SECTION - C

13. Prove that $3 - 2\sqrt{5}$ is an irrational number.
14. The sum of the first 14 terms of an AP is 1050 and its 14^{th} term is 140. Find the 20^{th} term.
15. Two poles of heights. 6m and 11m stand on a plane ground. If the distance between the feet of the poles is 12m, find the distance between their tops.
16. Show that $(x - 1)$ is a factor of $x^3 - 7x^2 + 14x - 8$. Hence completely factorise the given expression.
17. The marks of 20 students in a test were as follows.
    2, 6, 8, 9, 10, 11, 11, 12, 13, 13, 14, 14, 15, 15, 15, 16, 16, 18, 19 and 20.
    Calculate a) the mean. b) the median. c) the mode.
18. In the given figure $\angle B = \angle E$, $\angle ACD = \angle BCE$, AB = 10.4 cm and DE = 7.8 cm. Find the ratio between areas of the $\angle ABC$ and $\angle DEC$.



19. The monthly pocket money of Nita and Rani are in the ratio 5:7. Their expenditures are in the ratio 3:5. If each save ` 80 every month find their monthly pocket money.
20. Find how many terms of the series 17 + 15 + 13 + …… must be added to get sum equal to 72.
21. Apply Euclids division algorithm to find HCF of numbers, 4052 and 420.
22. What number should be added to $27x^3 - 54x^2 + 36x - 11$ so that the resulting polynomial becomes divisible by $3x - 2$?

SECTION - D

23. State and prove Basic proportionality Theorem.
24. Find the zeroes of the quadratic polynomial and verify the relationship between the zeroes and the coefficient.
    $4\ S^2 - 4S + 1$
25. Solve the given pair of equations graphically.
    $2x + 3y = 12$
    $x - y = 1$
    Shade the region between the two lines represented by the above equations and the X axis.
26. In a school, students decided to plant trees in and around the school to reduce air pollutions. It was decided that the number of trees that each section of each class will plant, will be five times of the class to which the respective section belongs. If there are 1 to 10 classes in the school and each class has three sections, find how many trees were planted by the students.
27. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg / hec)	50-55	55-60	60-65	65-70	70-75	75-80
Number of Farms	2	8	12	24	38	16

    Change the distribution to a more than type distribution and draw its Ogive.
28. A fraction becomes 1/3 when 1 is subtracted from the numerator and it becomes 1/4 when 8 is added to its denominator. Find the fraction. Form the pair of lines equations and find their solution by cross multiplication method.

29. Find the mode of the following frequency distribution.

Class	Frequency
0 - 10	4
10 - 20	4
20 - 30	7
30 - 40	10
40 - 50	12
50 - 60	8
60 - 70	5

30. The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
Number of Students	2	3	8	6	6	3	2