

KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS, HYD-32
SAMPLE PAPER TEST 04 (2017-18)

SUBJECT: MATHEMATICS
CLASS : X

MAX. MARKS : 80
DURATION : 3 HRS

General Instruction:

- (i) All questions are compulsory.
 - (ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
 - (iii) **Section A** comprises of 6 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 8 questions of **4 marks** each.
 - (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
 - (v) Use of Calculators is not permitted
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SECTION – A

Questions 1 to 6 carry 1 mark each.

1. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.
2. If $2x^2 - (2 + k)x + k = 0$ where k is a real number, find the value of k for which the roots of the equation are real and equal.
3. Which term of the AP 21, 18, 15, ..., is zero?
4. If the areas of two similar triangles are in ratio 25 : 64, write the ratio of their corresponding sides.
5. The coordinates of one end point of a diameter of a circle are (4, -1) and the coordinates of the centre are (1, -3). Find the coordinates of the other end of the diameter.
6. Express $\cot 85^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .

SECTION – B

Questions 6 to 12 carry 2 marks each.

7. 15 cards, numbered 1, 2, 3, ..., 15 are put in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn bears (i) an even number (ii) a number divisible by 2 or 3.
8. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is neither an ace nor a king.
9. If P(1, 2), Q(4, 6), R(5, 7) and S(a, b) are the vertices of a parallelogram PQRS then find the value of a and b .
10. In an AP, the 24th term is twice the 10th term. Prove that the 36th term is twice the 16th term.
11. By using Euclids algorithm find the HCF of 650 and 1170.
12. For what value of p will the following pair of linear equations have infinitely many solutions?
 $(p - 3)x + 3y = p$; $px + py = 12$

SECTION – C

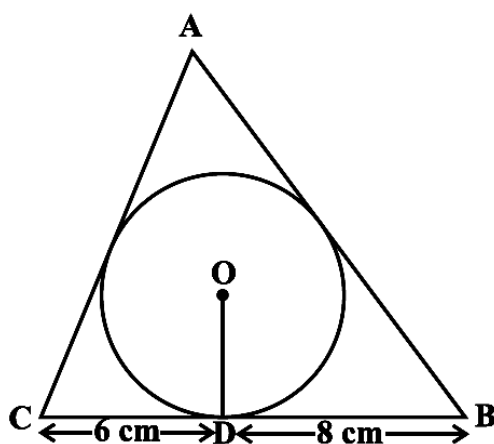
Questions 13 to 22 carry 3 marks each.

13. Show that any positive odd integer is of the form $6q + 1$, or $6q + 3$, or $6q + 5$, where q is some integer.
14. Divide the polynomial $p(x) = x^3 - 3x^2 + 5x - 3$ by the polynomial $g(x) = x^2 - 2$ and find the quotient and remainder.
15. If the points $A(1, -2)$, $B(2, 3)$, $C(-3, 2)$ and $D(-4, -3)$ are the vertices of parallelogram ABCD, then taking AB as the base, find the height of the parallelogram.

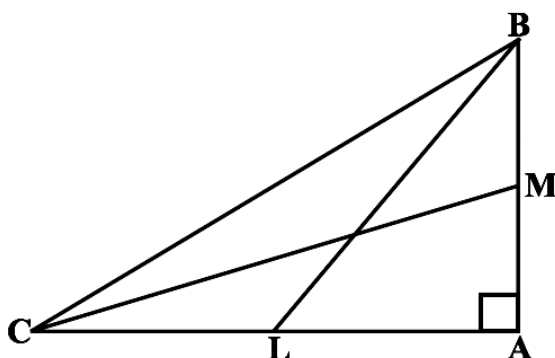
OR

In $\triangle PAB$, $PA = PB$ and area of $\triangle PAB = 10$ sq. units. Find the coordinates of P if coordinates of A and B are $(1, 2)$ and $(3, 8)$ respectively.

16. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively (see the below figure). Find the sides AB and AC.



17. BL and CM are medians of a triangle ABC right angled at A. Prove that $4(BL^2 + CM^2) = 5BC^2$.



OR

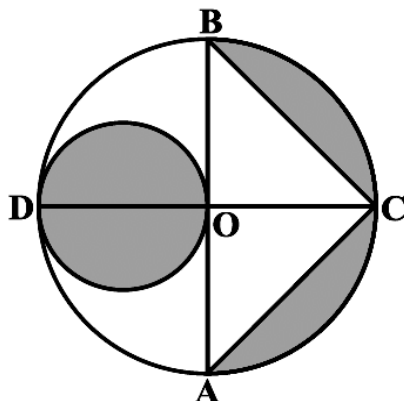
In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$.

18. If $\sec 4A = \operatorname{cosec}(A - 20^\circ)$, where $4A$ is an acute angle, find the value of A.

OR

Evaluate: $\frac{\sec 48^\circ}{\operatorname{cosec} 42^\circ} + \sqrt{3}(\tan 20^\circ \tan 60^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ)$

19. Meena went to a bank to withdraw Rs 2000. She asked the cashier to give her Rs 50 and Rs 100 notes only. Meena got 25 notes in all. Find how many notes of Rs 50 and Rs 100 she received.
20. In the below figure, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If $OA = 7$ cm, find the area of the shaded region.



21. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.

OR

A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

22. Find the mode of the following distribution:

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	5	8	7	12	28	20	10	10

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° , respectively. Find the height of the multi-storeyed building and the distance between the two buildings.
24. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.
- OR**
- A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.
25. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students? What values depicted from this?
26. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° .

27. Prove that “The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.”

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

28. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet. The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water the bucket can hold.

29. Prove that $\left(\frac{1 + \tan^2 A}{1 + \cot^2 A}\right) = \left(\frac{1 - \tan A}{1 - \cot A}\right)^2 = \tan^2 A$

30. The mean of the following data is 42. Find the missing frequencies x and y if the sum of the frequencies is 100.

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	7	10	x	13	y	10	14	9

OR

Convert the following frequency distribution to less than type cumulative frequency and draw its ogive:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	5	10	30	45	12	18