

**PRE-BOARD EXAMINATION, FEBRUARY – 2019.**

**CLASS: X**

**MATHEMATICS**

**Time: 3 hrs.**

**MAX. MARKS: 80**

**General Instructions:**

1. All the questions are compulsory.
2. The questions paper consists of 30 questions divided into 4 sections A, B, C and D.
3. 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. Section D comprises of 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, 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.
5. Use of calculators is not permitted.

**SECTION-A**

1. Find the largest number which divides 70 and 125 leaving remainders 5 and 8 respectively. 1
2. If  $\tan \alpha = \frac{1}{\sqrt{3}}$  and  $\sin \beta = \frac{1}{\sqrt{2}}$  then find  $\alpha + \beta$ . 1

**OR**

If  $\sin \theta = \cos \theta$ , then find the value of  $2 \tan \theta + \cos^2 \theta$

3. If the vertices of a triangle are (3,-5),(-7,4),(10,-k) and its centroid is (k,-1) then find the value of k. 1
4. If  $\frac{2}{3}$ , k,  $\frac{5}{8}k$  are the three consecutive terms of an AP, then find k. 1
5.  $\Delta PQR \sim \Delta XYZ$  and the perimeters of  $\Delta PQR$  and  $\Delta XYZ$  are 30 cm and 18 cm respectively. If  $QR = 9\text{cm}$ , find  $YZ$ . 1
6. If 2 is a root of the quadratic equation  $x^2 + ax + 12 = 0$  and the quadratic equation  $x^2 + ax + q = 0$  has equal roots then find the value of k. 1

**OR**

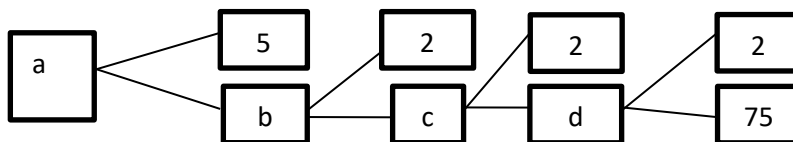
If the equation  $25x^2 - kx + 9 = 0$  has coincident roots, find the value of k.

**SECTION – B**

7. The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, find the other number. 2

**OR**

Find the missing numbers a,b,c and d in the prime factorization of



8. The sum of first 9 terms of an AP is zero and its 7<sup>th</sup> term is 10. Find the sum of first 23 terms. 2

**OR**

The 7<sup>th</sup> term of an AP is -4 and its 13<sup>th</sup> term is -16. Find the AP.

9. Find the ratio of the line segment joining A(6,3) and B(-2,-5) divided by the x-axis 2
10. A die is thrown twice. Find the probability of getting 2
- (i) The same number both times.
- (ii) The sum of numbers as 9.
11. A jar contains blue and green marbles. The number of green marbles is 5 more than twice the number of blue marbles. If the probability of drawing a blue marble at random is  $\frac{2}{7}$ , how many blue and green marbles are there in the jar? 2
12. For what value of k will the equations  $3x + 4y + 2 = 0$  and  $9x + 12y + k = 0$  represent coincident lines? 2

**SECTION – C**

13. Prove that  $\sqrt{3}$  is irrational. Then prove that  $7 - \sqrt{3}$  is irrational. 3
14. If  $\sqrt{5}$  and  $-\sqrt{5}$  are two zeroes of the polynomial  $x^3 + 3x^2 - 5x - 15$ , find its third zero. 3
15. 8 men and 6 boys can finish a piece of work in one day while 2 men and 3 boys can finish it in 3 days. Find the time taken by one man alone and that by one boy alone to finish the work. 3
16. A and B are the end points of a diameter of a circle having its center at (1, 2). If the coordinates of B are (-3, 5), find the coordinates of A. 3

**OR**

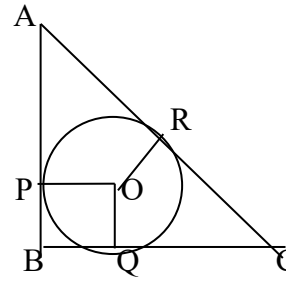
For what value of p are the points (2, 1), (p,-1) and (-1, 3) are collinear.

17. Prove that  $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2 \sec \theta$  3

**OR**

Prove that  $(1 + \tan A \tan B)^2 + (\tan A - \tan B)^2 = \sec^2 A \sec^2 B$

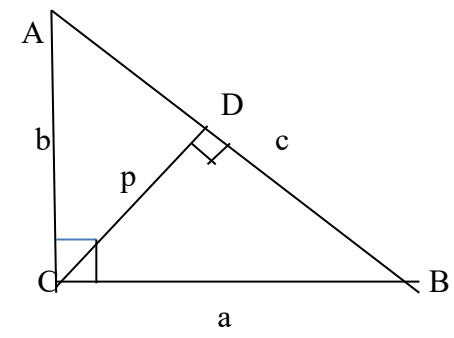
18. ABC is a triangle right angled at B Such that  $BC = 6\text{cm}$ ,  $AB = 8\text{cm}$ . A circle with center O is inscribed inside the triangle.  $OP \perp AB$ ,  $OQ \perp BC$  and  $OR \perp AC$ . If  $OP = OQ = OR = x$ . Find the value of x. 3



19. Find the area of the minor segment of a circle of radius 42 cm, if length of the corresponding arc is 44 cm. 3

20. ABC is a right triangle in which  $\angle C = 90^\circ$  and  $CD \perp AB$ . If  $BC = a$ ,  $CA = b$ ,  $AB = c$  and  $CP = p$  then Prove that 3

(i)  $cp = ab$   
(ii)  $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$



**OR**

Prove that the area of the equilateral triangle described on one side of a square is equal to the area of the equilateral triangle described on its diagonals.

21. A hemispherical bowl of internal radius 9 cm is full of liquid. This liquid is to be filled into cylindrical shaped small bottles each of diameter 3cm and height 4cm. How many bottles are necessary to empty the bowl. 3

**OR**

Water in a canal 6m wide and 1.5m deep is flowing with a speed of 10km/hr. How much area will it irrigate in 30 minutes, if 8cm of standing water is needed?

22. The IQ of 50 students are recorded as follows 3

IQ Score	80-90	90-100	100-110	110-120	120-130	130-140
No. of students	6	9	16	13	4	2

Find the mode of the data.

**SECTION- D**

23. Prove that 'In a right angled triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides'. 4
24. A bucket in the form of a frustum of a cone and holds 48.51 liters of water. The radii of the top and bottom are 28 cm and 7 cm respectively. Find the height of the bucket. 4
25. If the roots of the equation  $(a-b)x^2 + (b-c)x + (c-a) = 0$  are equal, prove that  $2a = b + c$  4

OR

A motor boat, whose speed is 15 km/hr in still water, goes 30km downstream and comes back in a total time of 4 hours and 30 minutes. Find the speed of the stream.

26. Construct a triangle ABC in which  $AB = 6.5$  cm,  $\angle B = 60^\circ$  and  $BC = 5.5$  cm. Also construct a triangle  $AB'C'$  similar to  $\Delta ABC$ , whose each side is  $\frac{3}{2}$  times the corresponding side of  $\Delta ABC$  4
27. The angle of elevation of an Aero plane from a point on the ground is  $60^\circ$ . After a flight of 30 seconds, the angle of elevation changes to  $30^\circ$ . If the plane is flying at a constant height of  $3600\sqrt{3}$  m, find the speed of the plane in km/hr. 4

OR

The angles of elevation of the top of a rock from the top and foot of a 100m high tower are respectively  $30^\circ$  and  $45^\circ$ . Find the height of the rock.

28. If the mean of the following frequency distribution is 188, find the missing frequencies  $f_1$  and  $f_2$ . 4

Classes	0-80	80-160	160-240	240-320	320-400	Total
Frequency	20	25	$f_1$	$f_2$	10	100

OR

During the medical checkup of 35 students of a class their weights were recorded as follows

Weight(in kg)	No. of students
38-40	3
40-42	2
42-44	4
44-46	5
46-48	14
48-50	4
50-52	3

Draw a less than type and more than type ogive from the given data. Hence obtain the median weight from the graph.

29. Nirmal received her pocket money on 1<sup>st</sup> Jan 2018. She puts Re 1 on day 1, Rs 2 on day 2, Rs 3 on day 3 and continued doing so till the end of the month from this money into her piggy bank. She also spent Rs 180 of her pocket money and had Rs 124 left with her at the end of the month. How much was the pocket money for the month? 4
30. If  $\tan A + \sin A = m$  and  $\tan A - \sin A = n$ , Show that  $m^2 - n^2 = 4\sqrt{mn}$  4