SAMPLE PAPER

SUBJECT : MATHEMATICS (X)

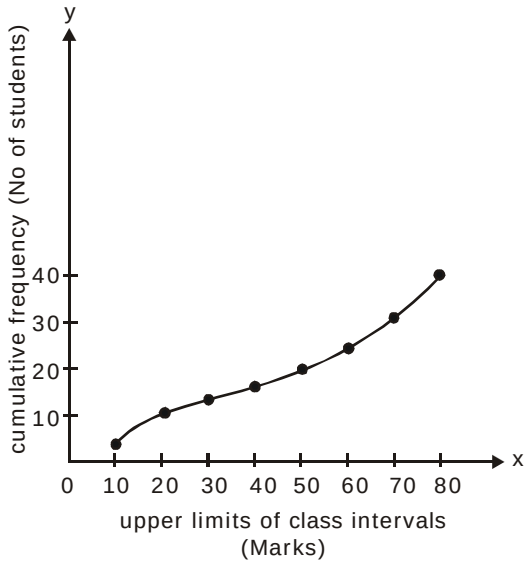
M.M. : 80 TIME : 3 HRS

GENERAL INSTRUCTIONS :

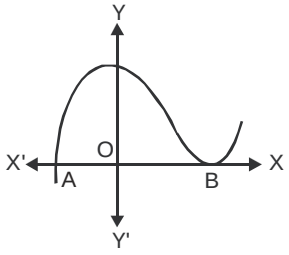
1. **All questions are compulsory.**
2. **The question paper consists of thirty questions divided into 4 section A, B, C and D. Section A comprises of ten questions of 01 marks each, section B comprises of five questions of 02 marks each, section C comprises of ten questions of 03 marks each and section D comprises of five questions of 06 marks each.**
3. **All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.**
4. **There is no overall choice. However, internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 06 marks each. You have to attempt only one of the alternatives in all such questions.**
5. **In question on construction, drawings should be neat and exactly as per the given measurements.**
6. **Use of calculator is not permitted. However, you may ask for mathematical tables.**

SECTION - A

Q.1 A Student draws a cumulative frequency curve for the marks obtained by 40 students of a class, as shown below. Find the median marks obtained by the students of the class.



Q.2 The graph of y = f(x) is given below. Find the number of zeroes of f(x).

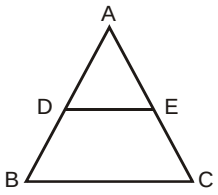


Q.3 Write 98 as product of its prime factors.

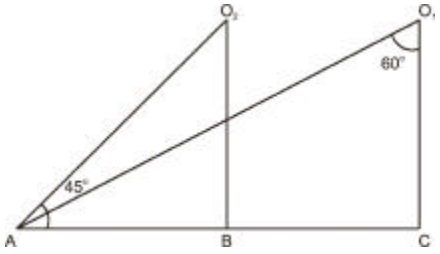
Q.4 If $\tan A = \frac{3}{4}$ and $A+B = 90°$, then what is the value of cotB?

Q.5 What is the nature of roots of the quadratic equation $4x^2 - 12x - 9 = 0$?

Q.6 In the given figure, DE is parallel to BC and AD = 1cm, BD = 2cm. What is the ratio of the area of ΔABC to the area of ΔADE ?



Q.7 In below fig. what are the angle of depression from the observing positions O_1 and O_2 of the object at A?



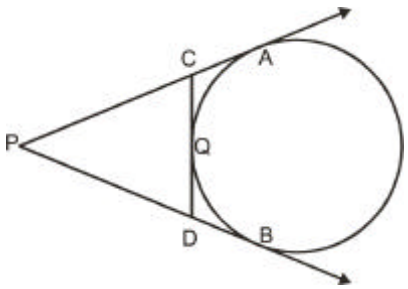
Q.8 For what value of k, the following pair of linear equations has infinitely many solutions ?

$10x + 5y - (k - 5) = 0$

$20x + 10y - k = 0$

Q.9 A bag contains 5 red and 4 black balls. A ball is drawn at random from the bag. What is the probability of getting a black ball ?

Q.10 In the figure given below, PA and PB are tangents to the circle drawn from an external point P. CD is a third tangent touching the circle at Q. If PB = 10cm, and CQ = 2cm, what is the length of PC ?



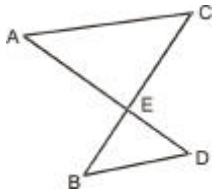
SECTION - B

Q.11 If the 10^{th} term of an A.P. is 47 and its first term is 2, find the sum of its first 15 terms.

Q.12 The coordinates of the vertices of ΔABC are A(4, 1), B(–3, 2) and C(0, k) Given that the area of ΔABC is 12 unit^2, find the value of k.

Q.13 Without using trigonometric tables, find the value of $\frac{\cos 70^\circ}{\sin 20^\circ}$ + cos57° cosec33° – 2cos60°.

Q.14 In the figure given below, AC is parallel to BD, is $\frac{AE}{CE} = \frac{DE}{BE}$? Justify your answer.



Q.15 A bag contains 5 red, 8 green and 7 white balls, One ball is drawn at random from the bag, find the probability of getting

(i) a white ball or a green ball

(ii) neither a green ball not a red ball

OR

One card is drawn from a well shuffled deck of 52 playing cards, Find the probability of getting

(i) a non-face card

(ii) A black king or a red queen

SECTION - C

Q.16 Using Euclid's division algorithm, find the HCF of 56, 96 and 404.

Q.17 Find the zeroes of the quadratic polynomial $x^2 + 5x + 6$ and verify the relationship between the zeroes and the coefficients.

Q.18 Show that $3 + 5\sqrt{2}$ is an irrational number.

Q.19 Draw the graph of the following pair of linear equations

$x + 3y = 6$

$2x – 3y = 12$

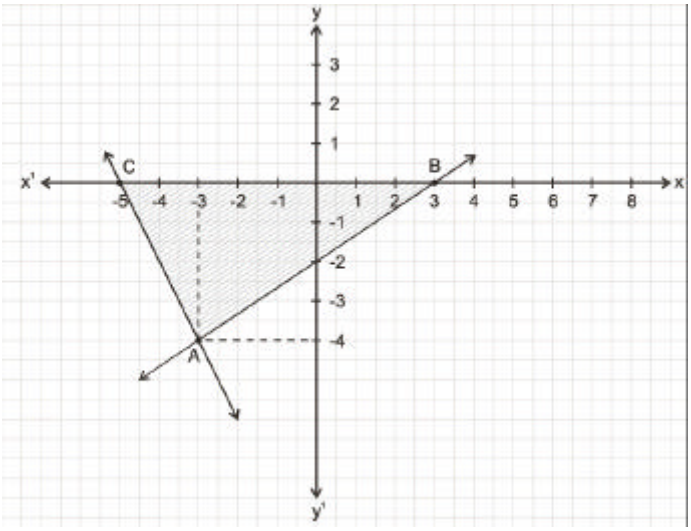
Hence find the area of the region bounded by the x = 0, y = 0 and 2x – 3y = 12

Q.20 Prove that $\frac{\sin\theta}{\cot\theta + \text{cosec}\,\theta} = 2 + \frac{\sin\theta}{\cot\theta - \text{cosec}\,\theta}$

OR

Evaluate : $\frac{\sec 29^\circ}{\text{cosec}\,61^\circ}$ + 2cot8° cot17° cot45° cot73° cot82° – 3 ($\sin^2 38^\circ + \sin^2 52^\circ$)

Q.21 Observe the graph given below and state whether triangle ABC is scalene, isosceles or equilateral. Justify your answer. Also find its area.



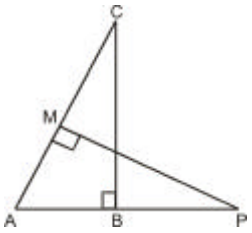
Q.22 In what ratio does the point P(2, –5), divide the line segment joining A(–3, 5) and B(4, –9) ?

Q.23 Construct a triangle similar to given ABC in which AB = 4 cm, BC = 6 cm and $\angle$ABC = 60°, such that each side of the new triangle is 3/4 of given ΔABC.

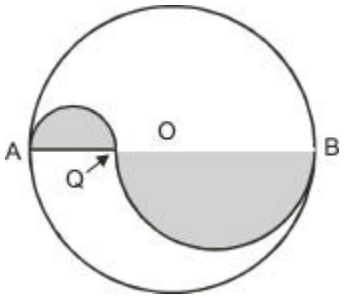
OR

A circle touches the side BC of a ΔABC at a point P and touches AB and AC when produced at Q and R respecively. Show that AQ = (1/2) (perimeter of ΔABC)

Q.24 If in the fig., ΔABC and ΔAMP are right angled at B and M respectively. Prove that CA × MP = PA × BC

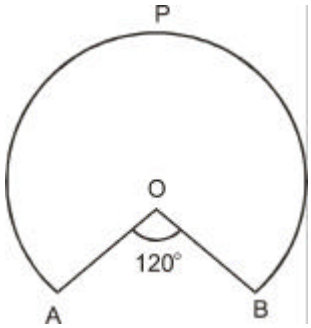


Q.25 Find the area of the shaded region of the fig. if the diameter of the circle with centre O is 28cm and AQ = 1/4 AB.



OR

In below Fig. OAPB is a sector of a circle of radius 3.5cm with the centre at O and $\angle AOB = 120°$. Find the length of OAPBO.



SECTION - D

Q.26 From the top of a building 100m high, the angles of depression of the top and bottom of a tower are observed to be 45° and 60° respectively. Find the height of the tower. Also find the distance between the foot of the building and bottom of the tower.

OR

The angle of elevation of the top of tower at a point on the level ground is 30°. After walking a distance of 100m towards the foot of the tower along the horizontal line through the foot of the tower on the same level ground, the angle of elevation of the top of the tower is 60°. Find the height of the tower.

Q.27 A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500km away in time, it had to increase the speed by 250 km/h from the usual speed. Find its usual speed.

Q.28 An iron pillar has lower part in the form of right circular cylinder and the upper part in the form of a right circular cone. The radius of the base of each of the cone and cylinder is 8cm. The cylindrical part is 240cm high and the conical part is 36cm high. Find the weight of the pillar if $1cm^3$ of iron weighs 7.5 grams. (Take $\pi = \frac{22}{7}$)

Q.29 Prove that the ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Use the above theorem, in the following.

The areas of two similar triangles are $81cm^2$ and $144cm^2$. If the largest side of the smaller triangle is 27cm, find the largest side of the larger triangle.

Q.30 The mean of the following frequency table is 53. But the frequencies f_1 and f_2 in the classes 20-40 and 60-80 are missing. Find the missing frequencies.

Age (in years)	0-20	20-40	40-60	60-80	80-10	Total
Number of people	15	f_1	21	f_2	17	100

OR

Find the median of the following frequency distribution.

Marks	Frequency
0-100	2
100-200	5
200-300	9
300-400	12
400-500	17
500-600	20
600-700	15
700-800	9
800-900	7
900-1000	4