SUBJECT: MATHEMATICS **MAX. MARKS : 80**

CLASS : X **DURATION : 3 HRS**

General Instruction:

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) 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, three 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.

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. The HCF of 52 and 130 is

(a) 52 (b) 130 (c) 26 (d) 13

2. Euclid's division lemma state that for any positive integers a and b, there exist unique integers q and r such that a = bq + r where r must satisfy

(a) $1 < r < b$ (b) $0 < r \le b$ (c) $0 \le r < b$ (d) $0 < r < b$

3. A **……** is a proven statement used for proving another statement.

(a) axiom (b) theorem (c) lemma (d) algorithm

4. The value of k for which (–4) is a zero of the polynomial $x^2 – x – (2k + 2)$ is

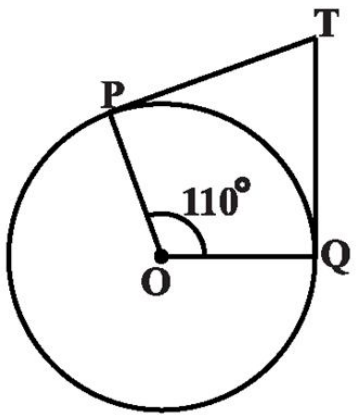
(a) 3 (b) 9 (c) 6 (d) –1

5. A quadratic polynomial whose zeroes are –3 and 4 is

(a) $x^2 – x + 12$ (b) $x^2 + x + 12$ (c) $2x^2 + 2x – 24$. (d) none of the above.

6. In the below figure, if TP and TQ are the two tangents to a circle with centre O so that ∠POQ = 110°, then ∠PTQ is equal to

(a) 60^0 (b) 70^0 (c) 80^0 (d) 90^0



7. What point on x – axis is equidistant from the points A(7, 6) and B(–3, 4)?

(a) (0, 4) (b) (–4, 0) (c) (3, 0) (d) (0, 3)

8. The distance between the points A(2, –3) and B(2, 2) is
(a) 2 units (b) 4 units (c) 5 units (d) 3 units

9. There are 6 marbles in a box with number 1 to6 marked on each of them . What is the probability of drawing a marble with number 2 ?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) 1

10. For a frequency distribution, mean, median and mode are connected by the relation
(a) mode = 3mean – 2median (b) mode = 2median – 3mean
(c) mode = 3median – 2mean (d) mode = 3median + 2mean

11. If the points A(2, 3), B(5, k) and C(6, 7) are collinear, then the value of k is _____

12. In ΔABC, right-angled at B, AB = 5 cm and $\angle ACB = 30°$ then the length of the side AC is ____

13. The value of $\frac{2\tan 30^0}{1+\tan^2 30^0}$ is ____

14. In triangles ABC and DEF, $\angle A = \angle E = 40^0$, AB : ED = AC : EF and $\angle F = 65^0$, then $\angle B$ = ___

15. The value of k for which equation $9x^2 + 8xk + 8 = 0$ has equal roots is _____

OR

The value of k for which the system of equations x – 2y = 3 and 3x + ky = 1 has a unique solution is _____

16. If sin A = $\frac{24}{25}$, then find the value of cosA.

OR

If $\tan\theta = \cot(30° + \theta)$, find the value of θ.

17. Which term of the AP 21, 42, 63, 84, ... is 420?

18. Find the area of the sector of a circle with radius 4 cm and of angle 30°.

19. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting a king of red colour

20. A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.

SECTION – B

Questions 21 to 26 carry 2 marks each.

21. If two coins are tossed simultaneously. Find the probability of getting one heads.

22. A lot of 25 bulbs contain 5 defective ones. One bulb is drawn at random from the lot. What is the probability that the bulb is good.

OR

Two dice are thrown simultaneously at random. Find the probability of getting a sum of seven.

23. Find the circumference of a quadrant of a circle whose area is 154 cm^2.

24. If tan 2A = cot (A – 18°), where 2A is an acute angle, find the value of A.

OR

If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$, $0° < A + B \leq 90°$, A > B, find A and B.

25. Divide $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$.

26. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

SECTION – C

Questions 27 to 34 carry 3 marks each.

27. Prove that $3 - 2\sqrt{5}$ is an irrational number.

OR

Three boys step off together from the same spot. Their steps measure 63 cm, 70 cm and 77 cm respectively. What is the minimum distance each should cover so that all can cover the distance in complete steps?

28. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$, and verify the relationship between the zeroes and the coefficients.

29. Solve the pair of linear equations 3x + 4y = 10 and 2x – 2y = 2:

30. Prove that: $(\cos ec\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

OR

Prove that: $(\cos ecA - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

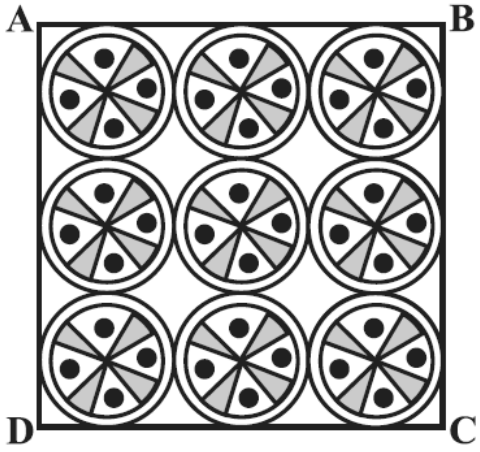
31. Draw a line segment of length 12 cm and divide it in the ratio 5 : 7. Measure the two parts.

OR

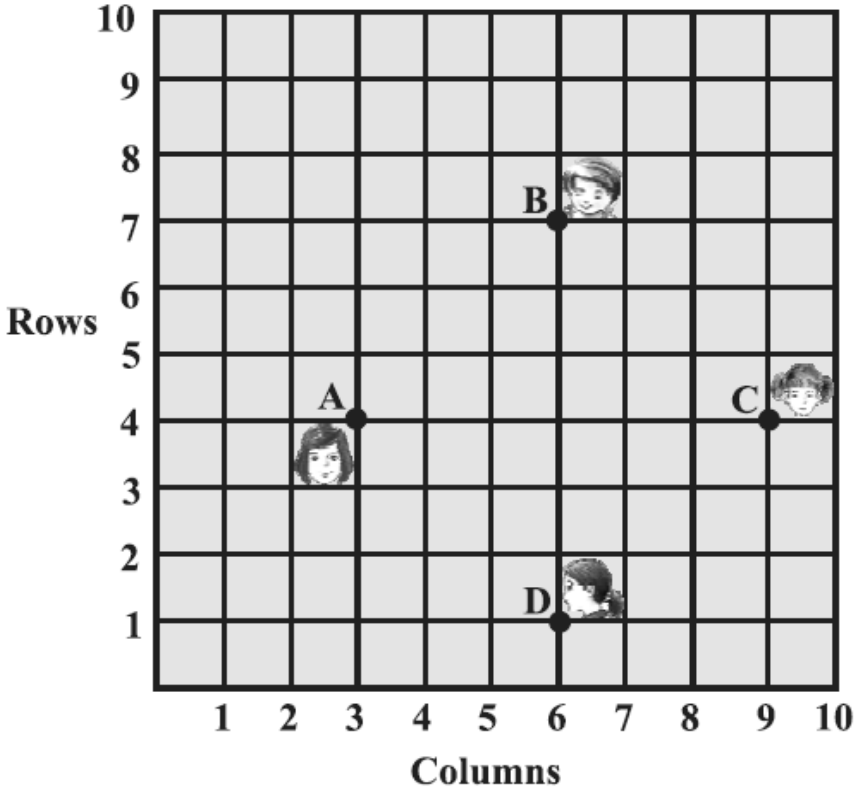
Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are 2/3 of the corresponding sides of the first triangle.

32. Prove that "The tangent to a circle is perpendicular to the radius through the point of contact."

33. On a square handkerchief, nine circular designs each of radius 7 cm are made (see below figure). Find the area of the remaining portion of the handkerchief.



34. In a classroom, 4 friends are seated at the points A, B, C and D as shown in below figure. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, "Don't you think ABCD is a square?" Chameli disagrees. Using distance formula, find which of them is correct.



SECTION – D

Questions 35 to 40 carry 4 marks each.

35. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.

36. How many terms of the AP : 9, 17, 25, . . . must be taken to give a sum of 636?

OR

Show that $a_1, a_2, \ldots, a_n, \ldots$ form an AP where an is defined as $a_n = 3 + 4n$. Also find the sum of the first 15 terms in each case.

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

OR

Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio."

38. Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

OR

From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2.

39. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

40. The following table gives production yield per hectare of wheat of 100 farms of a village.

production yield (in kg/ha)	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.