PRE BOARD EXAMINATION - 2025-26

CLASS - X

SUBJECT : MATHEMATICS (STANDARD)

Time : 3 Hrs. **Max. Marks : 80**

General Instructions:

1. This question paper has 5 sections A-E.
2. Section A has 20 questions carrying **1 mark** each.
3. Section B has 5 questions carrying **2 marks** each.
4. Section C has 6 questions carrying **3 marks** each.
5. Section D has 4 questions carrying **5 marks** each.
6. Section E has 3 case based integrated units of assessment **(04 marks each)**
7. All questions are compulsory, however internal choices have been provided in two questions of 2 marks, two questions of 3 marks and two questions of 5 marks.
8. Draw neat figures wherever required and take $\pi = 22/7$ if not stated.

Section A

1. The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is 40x, then the value of x is

(a) 5 (b) 13 (c) 40 (d) 8

2. The exponent of 5 in the prime factorization of 3750 is

(a) 3 (b) 4 (c) 5 (d) 6

3. Given p is a prime number and k is a positive integer. If p divides k^2, the which of the following is definitely divisible by p

$\frac{k}{2}$	k	k^3	7k

(a) only k (b) only k, 7k (c) only k, 7k, k^3 (d) all k, 7k, $\frac{k}{2}$, k^3

4. Hari correctly solved a pair of linear equations in two variables and found their only point of intersection as (3, -2). One of the lines was $x - y = 5$. The second equation of the line is

(a) $3x - 3y = 15$ (b) $2x - 3y = 12$ (c) $x + y = 5$ (d) $2x - 2y = 5$

5. If α and β are the zeroes of the polynomial $p(x) = x^2 - 1$, then the value of $(\alpha+\beta)$ is

(a) 2 (b) 1 (c) -1 (d) 0

6. The ratio of a two-digit number to the sum of the digits is 7:1. How many such two-digit numbers are possible?

(a) 4 (b) 10 (c) 9 (d) infinitely many

7. For what value of c, the equation $2x^2 - 20x + c = 0$ have equal roots

(a) - 40 (b) 50 (c) 30 (d) -10

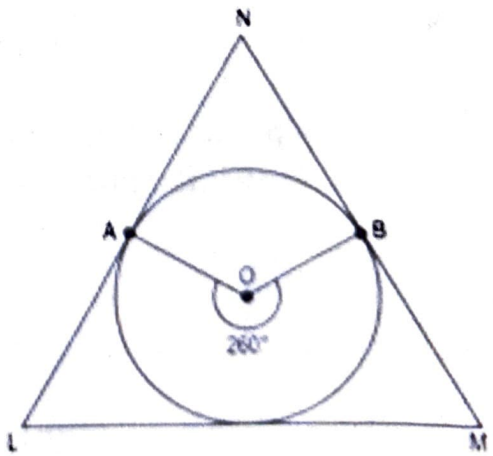
8. For the sequence: $\sqrt{2}, \sqrt{18}, \sqrt{50}, \sqrt{98}$, ..., the difference of 17th and 15th term is

(a) $4\sqrt{2}$ (b) $\sqrt{2}$ (c) $3\sqrt{2}$ (d) $16\sqrt{2}$

9. PQ is a line segment such that the ordinate of point P is -1 and point Q lies on the y-axis. If the mid-point of PQ is R (-3, -6), then the coordinates of Q are

(a) (0, 11) (b) (-6,-11) (c) (11,0) (d) (0, -11)

10. A circle with centre O is inscribed in a ΔLMN. A and B are the points of tangency. If reflex $\angle AOB = 260°$, then $\angle ANB$ is

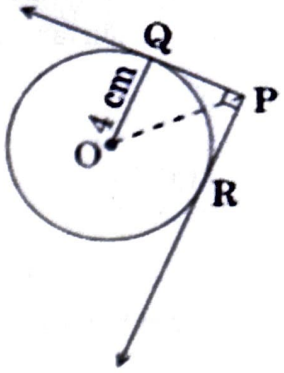


(a) 100° (b) 10°

(c)60° (d) 80°

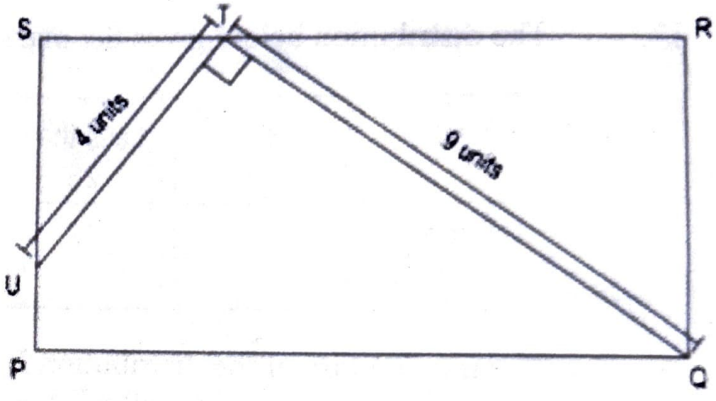
11. PQ and PR are two tangents drawn to a circle of radius 4 cm with centre O.

If $\angle QPR = 90°$, Then PQ + PR is equal to



(a) 4 cm (b) 2 cm (c) 8 cm (d) 16 cm

12. The figure PQRS is a rectangle and $\angle UTQ$ is a right angle. Which of the following statements is true for the ΔUTS and ΔTRQ



(a) The ratio of US:QR= 4:9 (b) The ratio of US:TR= 4:9

(c) The ratio of $\angle SUT$: $\angle RTQ$= 4:9 (d) Area of the triangles is equal

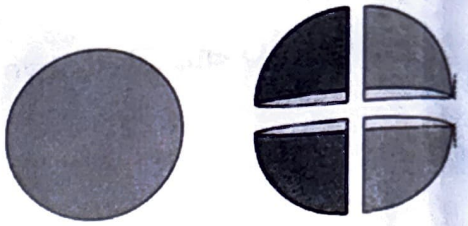
13. In a right-angled triangle PQR, $\angle Q = 90°$, then which of the following is always 0?

(a) cos P- sec R (b) tan P- cot R (c) sin P- cosec R (d) cannot be determined

14. $\frac{2\tan 30°}{1+\tan^2 30°}$ is equal to:

(a) $\sin 60°$ (b) $\cos 60°$ (c) $\tan 60°$ (d) $\sin 30°$

15. The surface area of a solid spherical ball is Scm². It is cut into 4 identical pieces as shown in the figure. The total surface area of the 4 identical pieces in terms of S is



(a) 4S (b) S (c) 2S (d) 8S

16. The mean of five numbers is 15. If we include one more number, then the mean of six numbers is 17. The included number is

(a) 27 (b) 37 (c) 17 (d) 25

17. The distribution below gives the marks obtained by 80 students in a test

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
Number of students	3	12	27	57	75	80

The modal class of the distribution is

(a) 10-20 (b) 20-30 (c) 30- 40 (d) 50-60

18. A three-digit number is chosen at random, the probability that its hundred's digit, ten's digit and one's digit are consecutive integers in descending order, is

(a) $\frac{1}{75}$ (b) $\frac{4}{225}$ (c) $\frac{2}{225}$ (d) $\frac{1}{45}$

DIRECTION: In question 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option from the following:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

19. Assertion (A): The product of $(5 + \sqrt{3})(2 - \sqrt{3})$ is anirrational number.
Reason (R): The product of two irrational numbers is an irrational number.

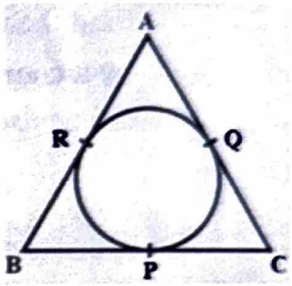
20. Assertion (A): ABCD is a trapezium with DC||AB, E and F are points on AD and BC respectively, such that EF||AB. Then, $\frac{AE}{ED} = \frac{BF}{FC}$

Reason (B): Any line parallel to parallel sides of a trapezium divides the non-parallel sides proportionally.

SECTION B

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

22. ABC is an isosceles triangle in which AB= AC, circumscribing a circle, as shown in the figure.
Prove that the base BC is bisected at the point of contact.



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

OR

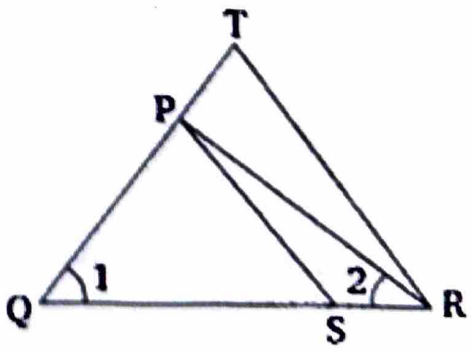
If tan A=3/4, find the value of $\frac{1}{\sin A} + \frac{1}{\text{Cos } A}$

24. In ΔABC, D and E are points on the sides AB and AC respectively such that DE||BC. If AD = x, DB = x – 2, AE = x + 2, and EC = x – 1, find x.

OR

If $\frac{QT}{PR} = \frac{QR}{QS}$ and $\angle 1 = \angle 2$.

Prove that ΔPQS ~ ΔTQR



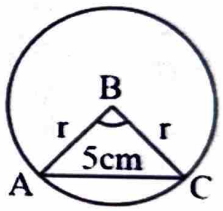
25. The wheels of a car are of diameter 70 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at the speed of 66 km per hour?

SECTION C

26. Prove $\frac{\tan A}{1+\sec A} - \frac{\tan A}{1-\sec A} = 2 \operatorname{cosec} A$

27. If α and β are the zeroes of the polynomial $f(x) = 2x^2 + 5x + k$ satisfying the relation $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$, then find the value of k for this to be possible. Hence find the roots of the quadratic polynomial.

28. Find the difference of the areas of two segments of a circle formed by a chord AC of length 5 cm subtending an angle of $\angle ABC = 90°$ at the centre.



OR

A chord AB of a circle of radius 15 cm makes an angle of 60° at the centre of the circle. Find:

(a) length of the corresponding arc AB
(b) area of minor sector
(c) area of major segment.

29. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

30. Find the sum of all integers between 50 and 500, which are divisible by 7.

OR

How many numbers lie between 10 and 300, which when divided by 4 leave a remainder 3? Also, find their sum.

31. Cards marked with numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from the box. Find the probability that the number of the card is:

a) an even number
b) a prime number less than 20.
c) a number which is a multiple of 5 or 7.

SECTION D

32. If the numerator of a fraction is multiplied by 2 and the denominator is reduced by 5, the fraction becomes $\frac{6}{5}$. And if the denominator is doubled and the numerator is increased by 8, the fraction becomes $\frac{2}{5}$. Find the fraction.

OR

A piece of cloth costs ₹ 200. If the piece was 5 m longer and each metre of cloth costs ₹ 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is the original cost per metre?

33. A (4, 2), B (6, 5) and C (1, 4) are the vertices of a triangle ABC.

(i) The median from A meets BC in D. Find the coordinates of D

(ii) Find the coordinates of point P on AD such that AP: PD=2:1

(iii) Find the centroid of the ABC

(iv) Find the ratio in which a point E $\left(\frac{14}{5}, \frac{14}{5}\right)$ divides the line segment joining A and C.

(1+1+1+2)

34. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°. At a point Y, 40 m vertically above X, the angle of elevation of the top Q is 45°. Find the height of the tower PQ and the distance XQ.

OR

A straight highway leads to the foot of a tower. A man standing on the top of a tower observes a car at angle of depression 30°, which is approaching to the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the total time taken by the car to reach the foot of the tower.

35. A survey regarding the heights (in cm) of 50 girls of class X of a school was conducted and the following data was obtained:

Height (in cm)	120-130	130-140	140-150	150-160	160-170
Number of Girls	2	8	12	20	8

SECTION D

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Number of Girls	2	8	12	20	8

Find the mean and median of the given data.
Using empirical relation, find the mode.

SECTION E

36. Due to increase in prices and fall in the purchasing value of the money, government keep on revising the travel fares from time to time. The auto charges in a city comprise of a fixed charge together with the charge for the distance covered. Study the following situations:

Name of the City	Distance travelled(km)	Amount paid (₹)
City A	10	75
	15	110
City B	8	91
	14	145

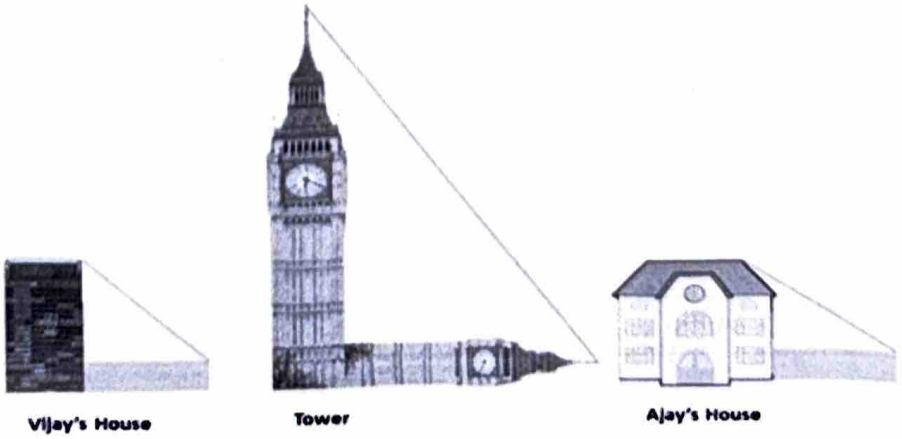
If the fixed charges of auto be ₹ x and the running charges be ₹ y per km, and both the cities have different values of x and y,then answer the following questions:

(i) Write the pair of linear equations representing the charges in City Aand City B. (1)

(ii) Find the values of x and y in city A and then calculate the amount paid by a person travelling 100 km in City A. (2)

(iii) Find the amount paid by a person in travelling 22 km in City B. (1)

37. Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house is 20 metres.
When Vijay's house casts a shadow 10 m long on the ground, at the same time, the tower casts a shadow 50 m on the ground and the house of Ajay casts 20 m shadow on the ground.



Based on the above information, answer the following questions:

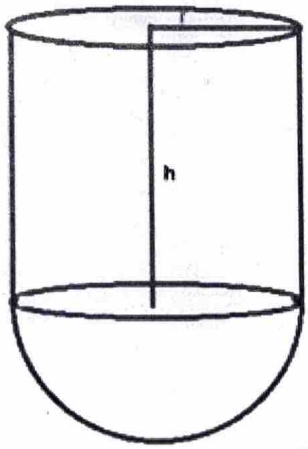
(i) Find the height of the tower. (1)

(ii) What similarity criteria has Vijay used to find the height? (1)

(iii) Find the height of the Ajay's house. (1)

(iv) When the tower casts a shadow of 40 m, then find the length of the shadow of Ajay's house. (1)

38. A metal smith wants to make a vessel in the form of a hemisphere bowl mounted by a hollow cylinder. The diameter of the hemispherical part is 42cm and the total height of the vessel is 63 cm.



Based on the above information, answer the following questions:

(i) Find the total surface area of the vessel. (2)

(ii) Find the volume of the vessel. (2)