CLASS 10 MATH TEST PAPER 26 (FULL SYLLABUS, 80 MARKS)

Class 10 - Mathematics

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

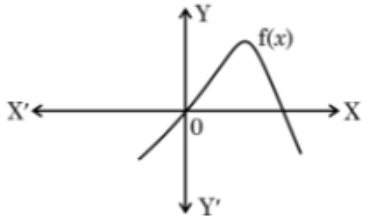
Section A

1. (HCF $\times$ LCM) for the numbers 70 and 40 is: **[1]**

   a) 280 b) 2800

   c) 10 d) 70

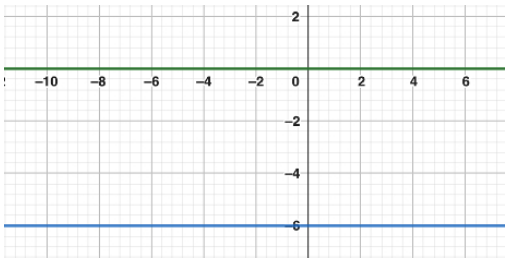
2. In the given figure, graph of a polynomial f(x) is shown. The number of zeroes of polynomial f(x) is: **[1]**



   a) 1 b) 3

   c) 2 d) 0

3. The pair of linear equations y = 0 and y = - 6 has: **[1]**



a) no solution

b) only solution (0, 0)

c) infinitely many solutions

d) a unique solution

4. The roots of the quadratic equation x^2 - 0.04 = 0 are: **[1]**

a) ± 0.02

b) 2

c) ± 0.2

d) 0.4

5. The nth term of an AP is 7 – 4n, then its common difference is **[1]**

a) – 4

b) – 3

c) 4

d) 3

6. The diameter of a circle is of length 6 cm. If one end of the diameter is (-4, 0), the other end on x-axis is at: **[1]**

a) (6, 0)

b) (0, 2)

c) (4, 0)

d) (2, 0)

7. XOYZ is a rectangle with vertices X(-3, 0), O(0, 0), Y(0, 4) and Z(x, y). The length of its each diagonal is **[1]**

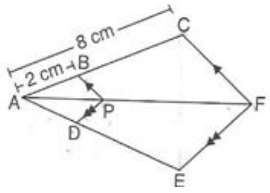
a) 4 units

b) $x^2 + y^2$ units

c) 5 units

d) X

8. In the given figure if $BP||CF$, $DP||EF$,then AD: DE is equal to **[1]**



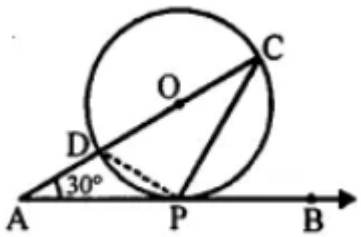
a) 1 : 3.

b) 3 : 4.

c) 2 : 3.

d) 1 : 4.

9. In the given figure, O is the centre of the circle. AB is the tangent to the circle at the point P. If ∠PAO = 30° then ∠CPB + ∠ACP is equal to **[1]**



a) 120°

b) 90°

c) 150°

d) 60°

10. The length of tangent drawn to a circle of radius 9 cm from a point 41 cm from the centre is: **[1]**

a) 41 cm

b) 9 cm

c) 50 cm

d) 40 cm

11. If $\sin\theta = \frac{3}{4}$, then $\frac{(\sec^2\theta - 1)\cos^2\theta}{\sin\theta}$ equals: **[1]**

a) $\frac{3}{5}$

b) $\frac{9}{16}$

c) $\frac{3}{4}$

d) $\frac{4}{3}$

12. For what value of θ, $\sin^2\theta + \sin\theta + \cos^2\theta$ is equal to 2? **[1]**

a) 0^o

b) 30^o

c) 45^o

d) 90^o

13. A vertical pole 10 m long casts a shadow of length 5 m on the ground. At the same time, a tower casts a shadow of length 12.5 m on the ground. The height of the tower is: **[1]**

a) 22 m

b) 25 m

c) 24 m

d) 20 m

14. The area of a sector of angle α (in degrees) of a circle with radius R is: **[1]**

a) $\frac{\alpha}{180} \times 2\pi R$

b) $\frac{\alpha}{180} \times \pi R^2$

c) $\frac{\alpha}{360} \times 2\pi R$

d) $\frac{\alpha}{360} \times \pi R^2$

15. A chord of a circle of radius 10 cm subtends a right angle at the centre. The area of the minor segments (given, π = 3.14) is **[1]**

a) 32.5 cm^2

b) 34.5 cm^2

c) 30.5 cm^2

d) 28.5 cm^2

16. For an event E, if P(E) + $P(\bar{E})$ = q, then the value of q^2 - 4 is: **[1]**

a) 5

b) -3

c) 3

d) -5

17. If three coins are tossed simultaneously, what is the probability of getting at most one tail? **[1]**

a) $\frac{3}{8}$

b) $\frac{5}{8}$

c) $\frac{7}{8}$

d) $\frac{4}{8}$

18. If the value of each observation of a statistical data is increased by 3, then the mean of the data **[1]**

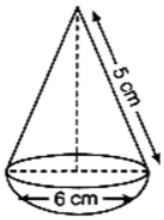
a) remains unchanged

b) increases by 3n

c) increase by 3

d) increases by 6

19. **Assertion (A):** The given figure represents a hemisphere surmounted by a conical block of wood. The diameter of their bases is 6 cm each and the slant height of the cone is 5 cm. The volume of the solid is 196 cm^3 **[1]**



Reason (R): The volume hemisphere is given by $\frac{2}{3}\pi r^3$

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

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

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** $a_n - a_{n-1}$ is not independent of n then the given sequence is an AP. **[1]**

Reason (R): Common difference $d = a_n - a_{n-1}$ is constant or independent of n.

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

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

c) A is true but R is false.

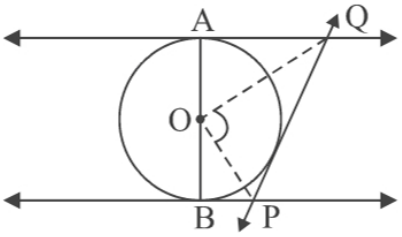
d) A is false but R is true.

Section B

21. Find the HCF and LCM of 26, 65 and 117, using prime factorisation. **[2]**

22. In $\triangle$PQR, if S and T are two points on the sides PQ and PR respectively such that PS = 2.4 cm, SQ = 7.2 cm, PT = 1.8 cm and TR = 5.4 cm, then state whether ST||QR or not. **[2]**

23. In the given figure, AB is a diameter of the circle with centre O. AQ, BP and PQ are tangents to the circle. Prove that $\angle POQ = 90^o$. **[2]**

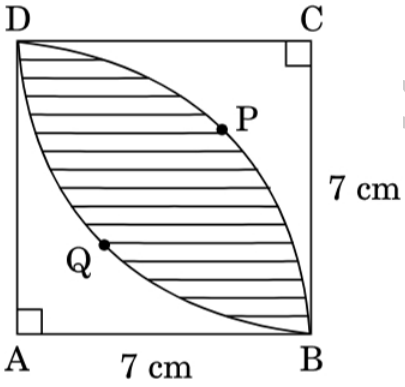


24. If cos A = $\frac{5}{13}$, then verify that $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A}$ = cos A + sin A. **[2]**

OR

If $\tan\theta = \frac{1}{\sqrt{7}}$, then show that $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta} = \frac{3}{4}$.

25. Calculate the area of the shaded region common between two quadrants of circles of radius 7 cm each (as shown in Figure). **[2]**



OR

Three horses are tied each with 7 m long rope at three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses.

Section C

26. Amita, Suneha and Raghav start preparing cards for greeting each person of an old age home on new year. In order to complete one card, they take 10, 16 and 20 minutes respectively. If all of them started together, after what time will they start preparing a new card together ? Why do you think there is a need to show elders that the young generation cares for them and remembers the contribution made by them in the prime of their life? **[3]**

27. Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the **[3]**

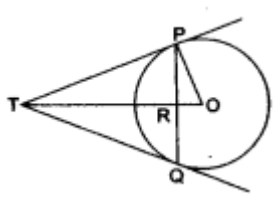
coefficients.

28. In an A.P., the sum of first n terms is $\frac{n}{2}(3n+5)$. Find the 25^{th} term of the A.P. **[3]**

OR

The sum of the first five terms of an AP and the sum of the first seven terms of the same AP is 167. If the sum of the first ten terms of this AP is 235, find the sum of its first 20 terms.

29. PQ is a chord of length 4.8 cm of a circle of radius 3 cm. The tangents at P and Q intersect at a point T as shown in the figure. Find the length of TP. **[3]**



OR

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.

30. Prove that: sec A (1 - sin A) (sec A + tan A) = 1 **[3]**

31. The median of the following frequency distribution is 35. Find the value of x. **[3]**

Class:	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency:	6	3	x	12	19

Section D

32. Two pipes together can fill a tank in $\frac{15}{8}$ hours. The pipe with larger diameter takes 2 hours less than the pipe with smaller diameter to fill the tank separately. Find the time in which each pipe can fill the tank separately. **[5]**

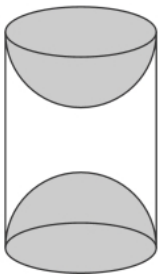
OR

Solve for x

$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$ where $a + b + x \neq 0$ and $a, b\ x \neq 0$

33. From the top of a building 60 m high, the angles of depression of the top and bottom of a tower are observed to be 30^o and 60^o respectively. Find the height of the tower. Also, find the distance between the building and the tower. (Use $\sqrt{3}$ = 1.732) **[5]**

34. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in the figure. If the height of the cylinder is 5.8 cm and its base is of radius 2.1 cm, find the total surface area of the article. **[5]**



OR

A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them being 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid.

35. The table below shows the daily expenditure on food of 30 households in a locality: **[5]**

Daily expenditure(in Rs)	**Number of households**
100 - 150	6

150 - 200	7
200 - 250	12
250 - 300	3
300 - 350	2

Find the mean and median daily expenditure on food.

Section E

36. **Read the following text carefully and answer the questions that follow:** **[4]**

A coaching institute of Mathematics conducts classes in two batches I and II and fees for rich and poor children are different. In batch I, there are 20 poor and 5 rich children, whereas in batch II, there are 5 poor and 25 rich children. The total monthly collection of fees from batch I is ₹ 9000 and from batch II is ₹ 26,000. Assume that each poor child pays ₹ x per month and each rich child pays ₹ y per month.

i. Represent the information given above in terms x and y. (1)

ii. Find the monthly fee paid by a poor child. (1)

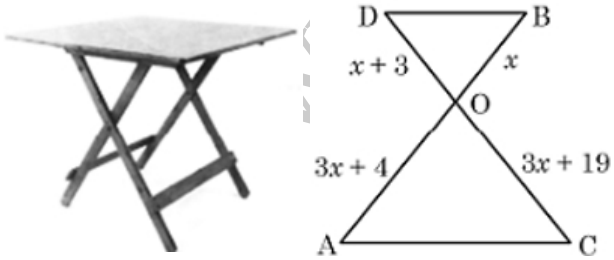
iii. Find the difference in the monthly fee paid by a poor child and a rich child. (2)

OR

If there are 10 poor and 20 rich children in batch II, what is the total monthly collection of fees from batch II? (2)

37. **Read the following text carefully and answer the questions that follow:** **[4]**

In the figure given below, a folding table is shown:



The legs of the table are represented by line segments AB and CD intersecting at O. Join AC and BD. Considering table top is parallel to the ground, and OB = x, OD = x + 3, OC = 3x + 19 and OA = 3x + 4, answer the following questions:

i. Prove that △OAC is similar to △OBD.

ii. Prove that $\frac{OA}{AC} = \frac{OB}{BD}$

iii. a. Observe the figure and find the value of x. Hence, find the length of OC.

OR

b. Observe the figure and find $\frac{BD}{AC}$.

38. **Read the following text carefully and answer the questions that follow:** **[4]**

In an examination hall, students are seated at a distance of 2 m from each other, to maintain the social distance due to CORONA virus pandemic. Let three students sit at points A, B and C whose coordinates are (4, -3), (7, 3) and (8, 5) respectively.

i. What is the distance between A and C? (1)

ii. If an invigilator at point 7, lying on the straight line joining B and C such that it divides the distance between them in the ratio of 1 : 2. Then what are the coordinates of I(invigilator)? (1)

iii. What is the mid-point of the line segment joining A and C? (2)

OR

What is the ratio in which B divides the line segment joining A and C? (2)