

Sample Question Paper 14

Mathematics 10th (Standard)

Time : 3 Hrs.

Max. Marks : 80

General Instructions

Read the following instructions carefully and follow them.

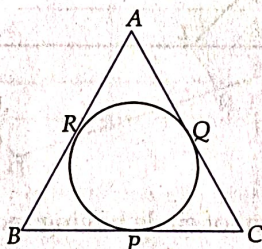
1. This question paper contains 38 questions. All questions are compulsory.
2. This question paper is divided into 5 section A, B, C, D and E.
3. In Section A, question numbers 1-18 are Multiple Choice Questions (MCQs) and question number 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, question numbers 21-25 are Very Short Answer (VSA) type questions, carrying 02 marks each.
5. In Section C, question numbers 26-31 are Short Answer (SA) type questions, carrying 03 mark each.
6. In Section D, question numbers 32-35 are Long Answer (LA) type questions, carrying 05 marks each.
7. In Section E, question numbers 36-38 are Case Study Based questions carrying 4 marks each with sub parts of the values 1, 1 and 2 marks each respectively.
8. There is no overall choice. 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 clear figures wherever required. Take $\pi = 22/7$ wherever required if not stated.
10. Use of calculators is not allowed.

Section A Multiple Choice Questions (Each Que. carries 1 M)

1. If $\tan \alpha = 1$ and $\sec \beta = \sqrt{2}$, then the value of $\alpha + \beta$ is
(a) 0° (b) 90° (c) 60° (d) 45°
2. The value of $\left(\cos^2 \theta + \frac{1}{1 + \cot^2 \theta} \right)$ is
(a) 0 (b) -1 (c) 1 (d) 2
3. If the pair of linear equations $x + 2y = 5$ and $7x + 3y = 13$ has unique solution, then the values of x and y , respectively are
(a) 1, 2 (b) 2, 1 (c) 1, 1 (d) 2, 2
4. If a sector subtends an angle of 120° at a centre of circle having radius of 22 cm, then the length of arc is
(a) 50 cm (b) 65.7 cm (c) 46.09 cm (d) 56 cm
5. The maximum number of students among whom 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and same number of pencils, is
(a) 90 (b) 80 (c) 91 (d) 85
6. $\frac{8\sqrt{27} + \sqrt{8}}{\sqrt{3}}$ is a/an
(a) whole number. (b) irrational number. (c) rational number. (d) prime number.

Stage III : Excellence Level

7. A card is randomly drawn from a deck of 52 cards. The probability that this card bears an even number in black is
 (a) $\frac{4}{26}$ (b) $\frac{5}{26}$ (c) $\frac{3}{26}$ (d) None of these
8. The sum of three numbers in AP is 27 and their product is 405. The common difference is
 (a) ± 6 (b) -6 (c) 6 (d) None of these
9. Three cubes each of side 5 cm are joined end to end. The surface area of the resulting solid is
 (a) 350 cm^2 (b) 450 cm^2 (c) 300 cm^2 (d) 400 cm^2
10. If coordinates of point $A(-3, 2)$ and $B(7, 3)$, then find the coordinates of points, which divides AB in the ratio $3:2$.
 (a) $(\frac{13}{5}, 3)$ (b) $(5, \frac{13}{4})$ (c) $(5, \frac{13}{3})$ (d) $(3, \frac{13}{5})$
11. If 5th term of AP is 15 and 9th term is 5, then 13th term of that AP is
 (a) -5 (b) 5 (c) 0 (d) -10
12. If $2x + y = 37$ and $5x + 2y = 85$, then (x, y) is
 (a) $(12, 13)$ (b) $(11, 15)$ (c) $(10, 17)$ (d) $(13, 9)$
13. The positive value of k , for which the equation $x^2 + kx + 144 = 0$ has real and equal roots, is
 (a) 32 (b) 24 (c) 28 (d) 22
14. If the mode of a data is 75 and mean is 45, then the median is
 (a) 65 (b) 55 (c) 35 (d) 45
15. A circle is inscribed in a $\triangle ABC$, touching BC , CA and AB at P , Q and R , respectively as shown in the figure. If $BC = 7 \text{ cm}$, $BR = 4 \text{ cm}$ and $AQ = 5 \text{ cm}$, then the length of AC is



- (a) 8 cm (b) 6 cm (c) 9 cm (d) 7 cm
16. Find the point on X -axis, which is equidistant from point $P(-3, -5)$ and $Q(4, -3)$.
 (a) $(3, 0)$ (b) $(\frac{-9}{14}, 0)$ (c) $(5, 7)$ (d) $(\frac{-2}{7}, 0)$
17. If the distance between the points $(4, p)$ and $(1, 0)$ is 5 units, then the value of p is
 (a) ± 2 (b) 2 (c) 4 (d) ± 4
18. If $\text{LCM} = 350$ and product of two numbers is 25×70 , then their HCF is
 (a) 12 (b) 15 (c) 5 (d) 10

Assertion-Reason Based Questions

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (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) $\cot^2 A - \tan^2 A = 1$ is a trigonometric identity.

Reason (R) An equation involving trigonometric ratios of an angle is called trigonometric identity, if it is true for all values of the angles involved.

20. Assertion (A) If the area of sector of a circle is $\frac{6}{18}$ of the area of the circle, then angle subtended by it at centre of circle is 120° .

Reason (R) Area of sector of a circle = $\frac{\theta}{360^\circ} \times \text{area of circle}$, where θ is angle of sector.

Section B Very Short Answer Type Questions (Each Que. carries 2 M)

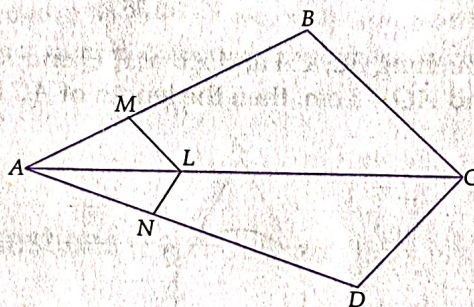
21. (a) Meena went to a bank to withdraw ₹ 16000. She received ₹ 500 and ₹ 200 notes. If Meena got 50 notes in all then how many notes of ₹ 200 and ₹ 500 did she receive?

Or

(b) Find the value of p for which the system of equations $px - 5y = 2$; $8x + 3y - 7 = 0$ has no solution.

22. An observer is standing $20\sqrt{3}$ m away from a tower. Determine the height of tower if angle of elevation to top of the tower is 30° .

23. In the following figure, $LM \parallel BC$ and $LN \parallel CD$, then prove that $\frac{ML}{BC} = \frac{AL}{AC}$.



24. (a) Find area of segment made in a quadrant of circle having radius of 15 cm.

Or

(b) In a circle of radius 28 cm, an arc subtends an angle of 90° at the centre.

Find

- the length of the arc.
- the area of the sector.

25. If the zeroes of the polynomial $x^2 + kx + l$ are double of the zeroes of $2x^2 - 5x - 3$, then find the value of k and l .

Section C Short Answer Type Questions (Each Que. carries 3 M)

26. If sum of the sequence 1, 6, 11, 16, ..., x is 148, then find the value of x .

27. Show that $10 + 5\sqrt{3}$ is an irrational number.

28. (a) Prove that $(\sec A - \sin A)(\operatorname{cosec} A + \cos A) = \sin^2 A \tan A + \cot A$.

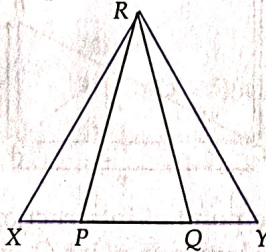
Or

(b) If $7\sin^2 \theta + 3\cos^2 \theta = 4$ and θ is an acute angle, then prove that $\sec \theta + \operatorname{cosec} \theta = \frac{2}{\sqrt{3}} + 2$.

29. (a) Name the type of quadrilateral formed by the points $(-1, -2)$, $(1, 0)$, $(-1, 2)$, $(-3, 0)$.

Or (b) If the point $P(2, 1)$ lies on the line segment joining points $A(4, 2)$ and $B(8, 4)$, and $AP = \frac{AB}{k}$, then find the value of k .

30. In given figure, ΔPQR is an isosceles triangle with $PR = QR$. If PQ is produced on either side to X , and Y respectively such that $PX \times QY = PR^2$ then prove that $\angle XRP = \angle RYQ$.



31. If $(x + a)$ is a factor of $(2x^2 + 2ax + 5x + 10)$, then find the value of a . Hence, for this value of a , factorise $2x^2 + 2ax + 5x + 10$.

Section D Long Answer Type Questions (Each Que. carries 5 M)

32. Thirty women were examined in a hospital by a doctor and the number of heartbeats per minute were recorded and summarised as follows. Find the mean heartbeats per minute for these women, choosing a suitable method.

Number of heartbeats per minute	Number of women
65-68	2
68-71	4
71-74	3
74-77	8
77-80	7
80-83	4
83-86	2

33. (a) Find the solution of equation $\frac{x-4}{x-5} + \frac{x-6}{x-7} = \frac{10}{3}$, $x \neq 5, 7$.

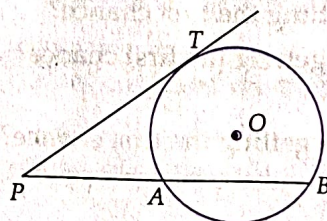
Or (b) Solve the following quadratic equation by factorisation method. $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, $a+b \neq 0$.

34. Interior of a building is in two parts. One part in cylindrical shape and another part in conical shape mounted on cylindrical shape. If radius of base is 35 ft, height of cylindrical shape is 30 ft. and height of conical shape is 12 ft, then find

- (i) total surface area of interior. (ii) volume of building.

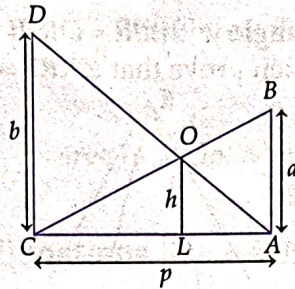
35. (a) The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the larger circle. BD is a tangent to the smaller circle touching it at D . Find the length of AD .

Or (b) In the given figure, PT is a tangent and PAB is a secant. If $PT = 6$ cm and $AB = 5$ cm, then find the length of PA .



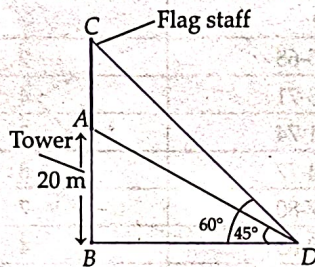
Section E Case-Study/Passage-Based (Each Que. carries 4 M)

36. Ritu is studying in X standard. She observes two poles AB and DC and the heights of these poles are a m and b m respectively, shown in the figure below.



These poles are p metre apart and O is the point of intersection of the lines joining the top of each pole to the foot of opposite pole and the distance between point O and L is h metre. Few questions came to her mind while observing the poles. Give answer to her questions by looking at figure.

- (i) If $CL = x$, then find x in terms of a , p and h . (1)
 - (ii) If $AL = y$, then find y in terms of p , b and h . (1)
 - (iii) (a) Find h in terms of a and b . (2)
 - Or (b) If $a = b$, then find $BC : DA$. (2)
37. Rekha is studying in X standard, she is observing a flag staff on a tower of height 20 m. At a point on the ground, the angle of elevation of the foot and top of the flag are 45° and 60° , respectively as shown in the figure.



Few questions arise in her mind while she is observing the flag staff. Give answer to her questions by looking at the figure.

- (i) What is the length of BD ? (1)
 - (ii) What is the length of AD ? (1)
 - (iii) (a) What is the length of the flag staff? (2)
 - Or
 - (b) If the length of (flag staff + tower) and its shadow are in the ratio $1 : \sqrt{3}$, then find the angle of elevation of the Sun. (2)
38. Neha, Lata and Sonia were fighting to get first chance in a game. Neha says, "let us toss two coins. If head appears on both, Lata will take first chance. If tail appears on both, Sonia will take first chance and if one head and one tail appears, I will get the chance."
- On the basis of the above information, answer the following questions.
- (i) What is the probability of Neha getting the first chance? (1)
 - (ii) (a) What is the probability of Lata getting the first chance? (2)
 - Or
 - (b) What is the probability of Sonia getting the first chance? (2)
 - (iii) Is her decision fair? (1)