Sample Paper 20

Class - 10th Exam - 2026 - 27

Mathematics - Basic

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

General Instructions :

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 Question 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 $\pi = \frac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION - A

Section A consists of 20 questions of 1 mark each.

1. An event is very unlikely to happen. Its probability is closest to

(a) 0.0001 (b) 0.001

(c) 0.01 (d) 0.1

2. The 2 digit number which becomes $\frac{5}{6}$th of itself when its digits are reversed. The difference in the digits of the number being 1, then the two digits number is

(a) 45 (b) 54

(c) 36 (d) None of these

3. The n^{th} term of the AP a, $3a$, $5a$, ... is

(a) na (b) $(2n-1)\,a$

(c) $(2n+1)\,a$ (d) $2na$

4. For which value(s) of p, will the lines represented by the following pair of linear equations be parallel

$$3x - y - 5 = 0$$

$$6x - 2y - p = 0$$

(a) all real values except 10 (b) 10

(c) 5/2 (d) 1/2

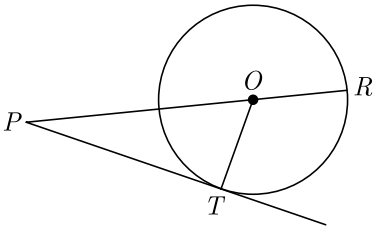
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5. $(x^2+1)^2 - x^2 = 0$ has

(a) Four real roots (b) Two real roots

(c) No real roots (d) One real root

6. In figure, on a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of the circle, then the length of PR is



(a) 30 cm (b) 28 cm

(c) 32 cm (d) 25 cm

7. Each root of $x^2 - bx + c = 0$ is decreased by 2. The resulting equation is $x^2 - 2x + 1 = 0$, then

(a) $b = 6, c = 9$ (b) $b = 3, c = 5$

(c) $b = 2, c = -1$ (d) $b = -4, c = 3$

8. The centroid of the triangle whose vertices are $(3, -7), (-8, 6)$ and (5, 10) is

(a) (0, 9) (b) (0, 3)

(c) (1, 3) (d) (3, 5)

9. The value of the expression $\text{cosec}(75^\circ + \theta) - \sec(15^\circ - \theta) - \tan(55^\circ + \theta) + \cot(35^\circ - \theta)$ is

(a) -1 (b) 0

(c) 1 (d) $\frac{3}{2}$

10. If the distance between the points $A(4, p)$ and $B(1, 0)$ is 5 units then the value(s) of p is(are)

(a) 4 only (b) -4 only

(c) ± 4 (d) 0

11. If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$

(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

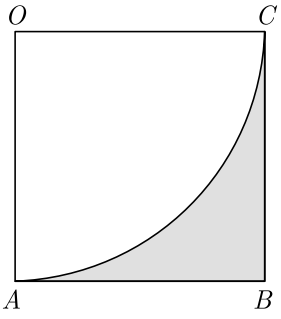
12. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

(a) 10 (b) -10

(c) -7 (d) -2

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13. In the adjoining figure, $OABC$ is a square of side 7 cm. OAC is a quadrant of a circle with O as centre. The area of the shaded region is



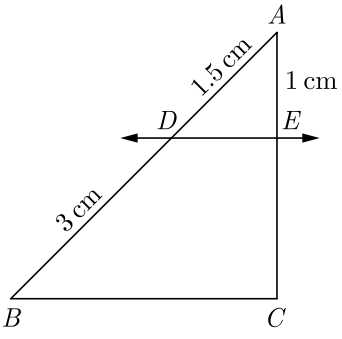
(a) $10.5\,\text{cm}^2$ (b) $38.5\,\text{cm}^2$
(c) $49\,\text{cm}^2$ (d) $11.5\,\text{cm}^2$

14. If the angle of depression of an object from a 75 m high tower is 30°, then the distance of the object from the tower is

(a) $25\sqrt{3}$ m (b) $50\sqrt{3}$ m
(c) $75\sqrt{3}$ m (d) 150 m

15. In an AP, if $a = 3.5$, $d = 0$ and $n = 101$, then a_n will be
(a) 0 (b) 3.5
(c) 103.5 (d) 104.5

16. In the given figure, $DE \parallel BC$. The value of EC is



(a) 1.5 cm (b) 3 cm
(c) 2 cm (d) 1 cm

17. If the radius of the sphere is increased by 100%, the volume of the corresponding sphere is increased by
(a) 200% (b) 500%
(c) 700% (d) 800%

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18. The median and mode respectively of a frequency distribution are 26 and 29, Then its mean is
(a) 27.5 (b) 24.5
(c) 28.4 (d) 25.8

19. **Assertion :** $\frac{13}{3125}$ is a terminating decimal fraction.

Reason : If $q = 2^m 5^n$ where m, n are non-negative integers, then $\frac{p}{q}$ is a terminating decimal fraction.

(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.

20. **Assertion :** The value of y is 6, for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10.
Reason : Distance between two given points $A(x_1, y_1)$ *and* $B(x_2, y_2)$ is given,

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

(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.

SECTION - B

Section B consists of 5 questions of 2 marks each.

21. Find the value of $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ is it equal to $\sin 90^\circ$ or $\cos 90^\circ$?

22. In a rectangle $ABCD, E$ is a point on AB such that $AE = \frac{2}{3}AB$. If $AB = 6$ km and $AD = 3$ km, then find DE.

23. Find the mode of the following frequency distribution.

Class	0- 10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	10	10	16	12	6	7

OR

The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students.

Marks obtained	0-5	5- 10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of students	1	0	2	0	0	10	25	7	2	1

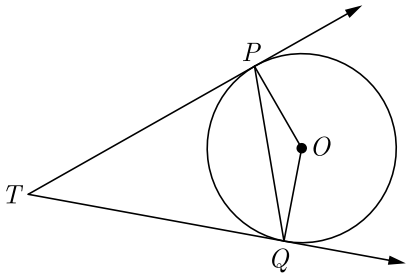
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24. Show that 571 is a prime number.

OR

If two positive integers p and q are written as $p = a^2b^3$ and $q = a^3b$, where a and b are prime numbers than verify $\text{LCM}(p, q) \times \text{HCF}(q, q) = pq$

25. In the given figure PQ is chord of length 6 cm of the circle of radius 6 cm. TP and TQ are tangents to the circle at points P and Q respectively. Find $\angle PTQ$.



SECTION - C

Section C consists of 6 questions of 3 marks each.

26. The marks obtained by 110 students in an examination are given below

Marks	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Number of Students	14	16	28	23	18	8	3

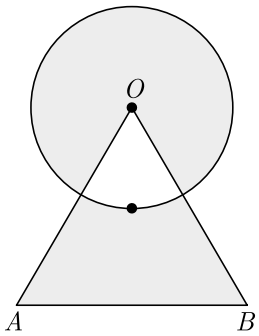
Find the mean marks of the students.

27. Find the middle term of the AP 7, 13, 19, ..., 247.

28. The circumference of a circle exceeds the diameter by 16.8 cm. Find the radius of the circle. Use $\pi = \frac{22}{7}$

OR

Find the area of shaded region shown in the given figure where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



29. Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

30. If the point $C(-1,2)$ divides internally the line segment joining the points $A(2,5)$ and $B(x,y)$ in the ratio $3:4$, find the value of $x^2 + y^2$.

OR

Find the ratio in which the point $(-3,p)$ divides the line segment joining the points $(-5,-4)$ and $(-2,3)$. Hence find the value of p.

31. 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. a, b and c are the sides of a right triangle, where c is the hypotenuse. A circle, of radius r, touches the sides of the triangle. Prove that $r = \frac{a+b-c}{2}$.

33. The internal and external diameters of a hollow hemispherical vessel are 16 cm and 12 cm respectively. If the cost of painting 1 cm^2 of the surface area is Rs. 5.00, find the total cost of painting the vessel all over. (Use $\pi = 3.14$)

34. Determine graphically whether the following pair of linear equations :

$$3x - y = 7$$
$$2x + 5y + 1 = 0 \text{ has :}$$

1. Unique solution
2. Infinitely many solutions or
3. No solution.

OR

Solve the following pair of linear equations graphically:
$x + 3y = 12,\ 2x - 3y = 12$
Also shade the region bounded by the line $2x - 3y = 2$ and both the co-ordinate axes.

35. A vertical tower stands on horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the ground, angle of elevation of the bottom and top of the flag-staff are 30° and 45° respectively. Find the height of the tower. (Take $\sqrt{3} = 1.73$)

OR

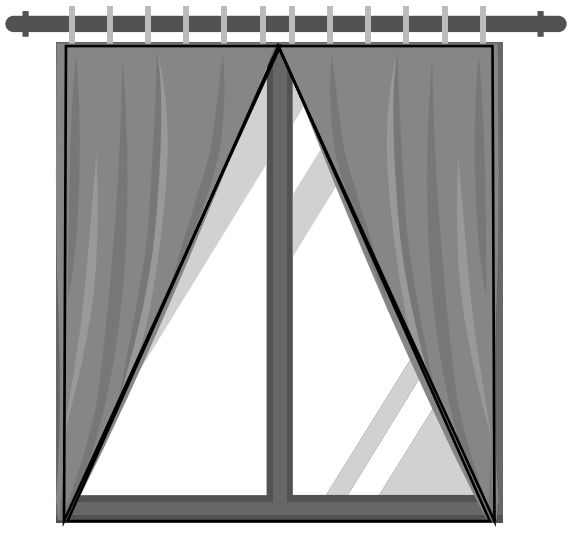
From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30° and 45° respectively. Find the distance between the cars. (Use $\sqrt{3} = 1.73$)

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SECTION - E

Section E consists of 3 case study based questions of 4 marks each.

36. Rani wants to make the curtains for her window as shown in the figure. The window is in the shape of a rectangle, whose width and height are in the ratio $2:3$. The area of the window is 9600 square cm.



(i) What is the shape of the window that is uncovered?

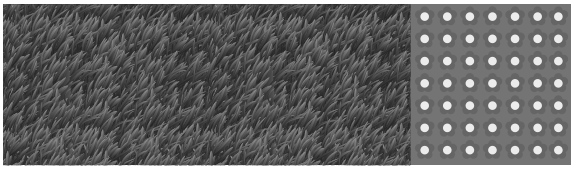
(ii) What will be the ratio of two sides of each curtain (other than hypotenuse) ?

(iii) What are the dimensions of the window ?

OR

How much window area is covered by the curtains?

37. Riya has a lawn with a flowerbed and grass land. The grass land is in the shape of rectangle while flowerbed is in the shape of square. The length of the grassland is found to be 3 m more than twice the length of the flowerbed. Total area of the whole lawn is 1260 m^2.



(i) If the length of the flowerbed is x m then what is the total length of the lawn ?

(ii) What is the value of x if the area of total lawn is 1260 m^2 ?

(iii) What is the area of grassland ?

OR

What is the ratio of area of flowerbed to area of grassland ?

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38. Family Structures : For a recent year, 51% of the families in the United States had no children under the age of 18; 20% had one child; 19% had two children; 7% had three children; and 3% had four or more children.



If a family is selected at random, find the following probability.

(i) Find the probability that the family has two or three children.

(ii) Find the probability that the family has more than one child.

(iii) Find the probability that the family has less than three children.

OR

Find the probability that the family has more than three children.

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