Sample Paper 13

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. The mean and median of the data a, b and c are 50 and 35 respectively, where $a < b < c$. If $c - a = 55$, then $(b - a)$ is

(a) 8 (b) 7

(c) 3 (d) 5

2. A circle artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground, then the height of pole, if the angle made by the rope with the ground level is 30°, is

(a) 5 m (b) 10 m

(c) 15 m (d) 20 m

3. For the following distribution

Marks	**Number of Students**	**Marks**	**Number of students**
Below 10	3	Below 40	57
Below 20	12	Below 50	75
Below 30	28	Below 60	80

The modal class is

(a) 0-20 (b) 20-30

(c) 30-40 (d) 50-60

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4. A quadratic polynomial, whose zeroes are -3 and 4, is

(a) $x^2 - x + 12$ (b) $x^2 + x + 12$

(c) $\frac{x^2}{2} - \frac{x}{2} - 6$ (d) $2x^2 + 2x - 24$

5. If ΔABC is right angled at C, then the value of $\sec(A+B)$ is

(a) 0 (b) 1

(c) $\frac{2}{\sqrt{3}}$ (d) not defined

6. A number x is selected from the numbers 1, 2, 3 and then a second number y is randomly selected from the numbers 1, 4, 9 then the probability that the product xy of the two numbers will be less than 9 is

(a) $\frac{3}{7}$ (b) $\frac{4}{9}$

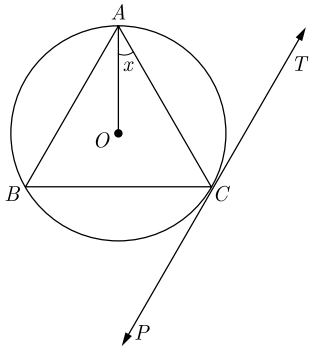
(c) $\frac{5}{9}$ (d) $\frac{7}{9}$

7. The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have is

(a) 3 (b) -3

(c) -12 (d) no value

8. In the adjoining figure, PT is a tangent at point C of the circle. O is the circumference of ΔABC. If $\angle ACP = 118^\circ$, then the measure of $\angle x$ is



(a) 28° (b) 32°

(c) 42° (d) 38°

9. Ramesh buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random a tank containing 5 male fish and 9 female fish. Then, the probability that the fish taken out is a male fish, is

(a) $\frac{5}{13}$ (b) $\frac{5}{14}$

(c) $\frac{6}{13}$ (d) $\frac{7}{13}$

10. The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, then the corresponding side of second triangle is ..... .

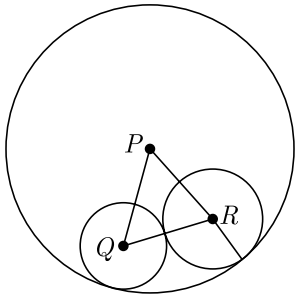
(a) 5.4 cm (b) 5.2 cm

(c) 4.9 cm (d) 5.1 cm

11. A right circular cylinder of radius r and height h (where, $h > 2r$) just encloses a sphere of diameter
(a) r (b) $2r$
(c) h (d) $2h$

12. If the perimeter of a semi-circular protractor is 36 cm, then its diameter is
(a) 10 cm (b) 14 cm
(c) 12 cm (d) 16 cm

13. In the given figure, three circles with centres P, Q and R are drawn, such that the circles with centres Q and R touch each other externally and they touch the circle with centre P, internally. If $PQ = 10\,\text{cm}$, $PR = 8\,\text{cm}$ and $QR = 12\,\text{cm}$, then the diameter of the largest circle is:



(a) 30 cm (b) 20 cm
(c) 10 cm (d) None of these

14. The quadratic equation $x^2 + x - 5 = 0$ has
(a) Two distinct real roots (b) Two equal real roots
(c) No real roots (d) More than 2 real roots

15. If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, than $x^2 + y^2$ is equal to
(a) 0 (b) 1/2
(c) 1 (d) 3/2

16. From the top of a 7 m high building the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°, then the height of the tower is
(a) 14.124 m (b) 17.124 m
(c) 19.124 m (d) 15.124 m

17. If the common difference of an AP is 5, then what is $a_{18} - a_{13}$?
(a) 5 (b) 20
(c) 25 (d) 30

18. In a right angled ΔABC right angled at B, if P and Q are points on the sides AB and BC respectively, then
(a) $AQ^2 + CP^2 = 2(AC^2 + PQ^2)$ (b) $2(AQ^2 + CP^2) = AC^2 + PQ^2$
(c) $AQ^2 + CP^2 = AC^2 + PQ^2$ (d) $AQ + CP = \frac{1}{2}(AC + PQ)$

19. **Assertion :** PA and PB are two tangents to a circle with centre O. Such that $\angle AOB = 110^\circ$, then $\angle APB = 90^\circ$.
Reason : The length of two tangents drawn from an external point are equal.
(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 roots of the quadratic equation $x^2 + 2x + 2 = 0$ are imaginary.
Reason : If discriminant $D = b^2 - 4ac < 0$ then the roots of quadratic equation $ax^2 + bx + c = 0$ are imaginary.
(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 21^{st} term of the AP $-4\frac{1}{2}, -3, -1\frac{1}{2}, ...$

22. If $A(5,2)$, $B(2,-2)$ and $C(-2,t)$ are the vertices of a right angled triangle with $\angle B = 90^\circ$, then find the value of t.

23. Show that any positive even integer can be written in the form $6q, 6q+2$ or $6q+4$, where q is an integer.

OR

Find the smallest natural number by which 1200 should be multiplied so that the square root of the product is a rational number.

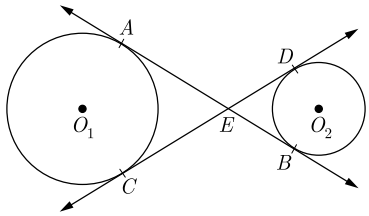
24. If five times the fifth term of an AP is equal to eight times its eighth term, show that its 13^{th} term is zero.

OR

Find the values of a, b and c, such that the numbers a, 10, b, c, 31 are in AP

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25. In Figure, common tangents AB and CD to the two circle with centres O_1 and O_2 intersect at E. Prove that $AB = CD$.



SECTION - C

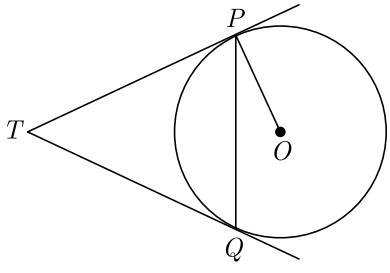
Section C consists of 6 questions of 3 marks each.

26. A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game.

27. For what value of p will the following system of equations have no solution ?

$$(2p-1)x+(p-1)y = 2p+1;\ y+3x-1=0$$

28. In figure, two tangents TP and TQ are drawn to circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.



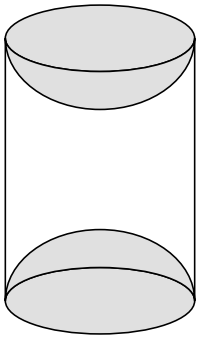
OR

A circle is inscribed in a ΔABC, with sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively. Find the length of AD, BE and CF.

29. A boy, flying a kite with a string of 90 m long, which is making an angle θ with the ground. Find the height of the kite. (Given $\tan\theta = \frac{45}{8}$)

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30. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article.



OR

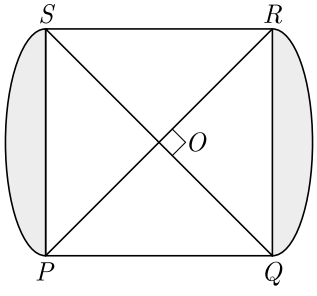
A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the volume of wood in the toy. Use $\pi = \frac{22}{7}$

31. Solve the following quadratic equation for x : $x^2 + \left(\frac{a}{a+b} + \frac{a+b}{a}\right)x + 1 = 0$

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. In figure, $PQRS$ is square lawn with side $PQ = 42$ metre. Two circular flower beds are there on the sides PS and QR with centre at O, the intersection of its diagonals. Find the total area of the two flower beds (shaded parts).



33. If α and β are the zeroes the polynomial $2x^2 - 4x + 5$, find the values of

(i) $\alpha^2 + \beta^2$

(ii) $\frac{1}{\alpha} + \frac{1}{\beta}$

(iii) $(\alpha - \beta)^2$

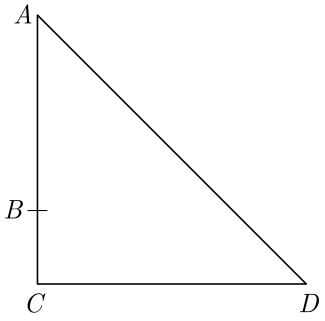
(iv) $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$

(v) $\alpha^2+\beta^2$

OR

If α and β are the zeroes of the polynomial $p(x)=2x^2+5x+k$ satisfying the relation, $\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$, then find the value of k.

34. In the right triangle, B is a point on AC such that $AB+AD=BC+CD$. If $AB=x, BC=h$ and $CD=d$, then find x (in term of h and d).



35. Find A and B if $\sin(A+2B)=\frac{\sqrt{3}}{2}$ and $\cos(A+4B)=0$, where A and B are acute angles.

OR

Evaluate the following : $\dfrac{2\cos^2 60^\circ+3\sec^2 30^\circ-2\tan^2 45^\circ}{\sin^2 30^\circ+\cos^2 45^\circ}$

SECTION - E

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

36. The Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund was created on 28 March 2020, following the COVID-19 pandemic in India. The fund will be used for combating, and containment and relief efforts against the coronavirus outbreak and similar pandemic like situations in the future.



The allotment officer is trying to come up with a method to calculate fair division of funds across various affected families so that the fund amount and amount received per family can be easily adjusted based on daily revised numbers. The total fund allotted for a village is $x^3+6x^2+20x+9$. The officer has divided the fund equally among families of the village and each family receives an amount of x^2+2x+2. After distribution, some amount is left.

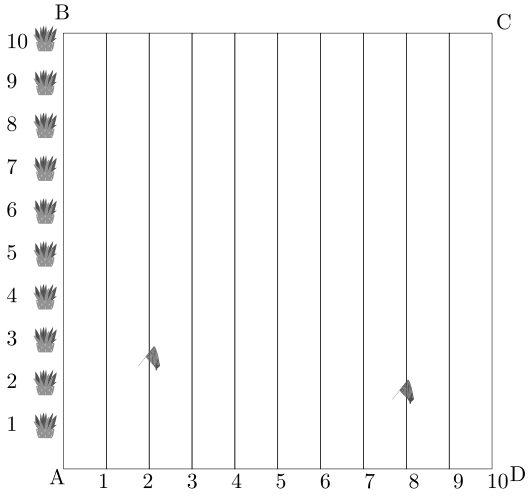
(i) How many families are there in the village?

(ii) If an amount of ₹1911 is left after distribution, what is value of x?

(iii) How much amount does each family receive?

(iv) What is the amount of fund allocated?

37. To conduct sports day activities, in a rectangular shaped school ground $ABCD$, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AB, as shown in figure. Nishtha runs $\frac{1}{4}$th the distance AB on the 2nd line and posts a green flag. Suman runs $\frac{1}{5}$th the distance AB on the 8th line and posts a red flag.



(i) What is the position of green flag ?

(ii) What is the position of red flag ?

(iii) What is the distance between both the flags?

(iv) What is the distance of red flag from point A ?

38. Salary Cut : Our personal and professional lives have taken quite a turn in the light of the corona-virus pandemic. Work-life has been revamped across the globe, in that working from home has become the norm for those employees and organizations that continue to carry on with their operations and functioning in the lock-down. Increments, incentives, businesses have all been impacted.

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The Covid-19 pandemic has stalled economic activity at an unprecedented scale globally, raising the spectre of job losses and salary cuts. Most of companies decided to bring down the salary by upto 50 %. The following table shows the salaries (in percent) received by 80 employee during lockdown.

Salary Received (in %)	40-50	50-60	60-70	70-80	80-90	90-100
Number of employee	4	10	14	20	24	8

Based on the above information, answer the following questions.

(i) What is the mean salary (in %) received ?

(ii) How many employee received more than 70 % salary ?

(iii) Find the total number of employee whose salary is reduced by more than 40 % ?

(iv) What is the lower limit of mode class of salary (in %) received?

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