Sample Paper 30

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 famous mathematician associated with finding the sum of the first 100 natural numbers is

(a) Pythagoras (b) Newton

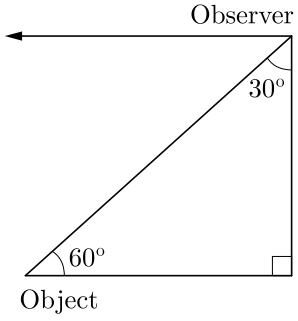
(c) Gauss (d) Euclid

2. 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

3. In the given figure, the positions of the observer and the object are mentioned, the angle of depression is



(a) 30° (b) 90°

(c) 60° (d) 45°

4. The point P on x-axis equidistant from the points $A(-1, 0)$ and $B(5, 0)$ is
(a) (2, 0) (b) (0, 2)
(c) (3, 0) (d) $(-3, 5)$

5. If α and β are zeroes and the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ is
(a) $\frac{15}{4}$ (b) $\frac{-15}{4}$
(c) 4 (d) 15

6. Volume of a spherical shell is given by
(a) $4\pi(R^2 - r^2)$ (b) $\pi(R^3 - r^3)$
(c) $4\pi(R^3 - r^3)$ (d) $\frac{4}{3}\pi(R^3 - r^3)$

7. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is
(a) 7 (b) 14
(c) 21 (d) 28

8. The area of the circle that can be inscribed in a square of side 6 cm is
(a) $36\pi\ \text{cm}^2$
(b) $18\pi\ \text{cm}^2$
(c) $12\pi\ \text{cm}^2$
(d) $9\pi\ \text{cm}^2$

9. If $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ is
(a) 0° (b) 30°
(c) 60° (d) 90°

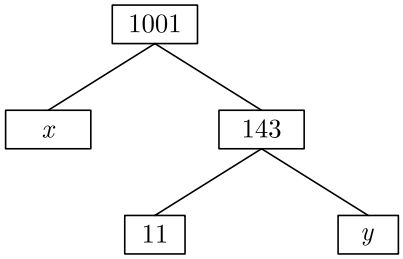
10. The distance between the points $(a\cos\theta + b\sin\theta,\ 0)$, and $(0,\ a\sin\theta - b\cos\theta)$ is
(a) $a^2 + b^2$
(b) $a^2 - b^2$
(c) $\sqrt{a^2 + b^2}$
(d) $\sqrt{a^2 - b^2}$

11. If the centre of a circle is (3, 5) and end points of a diameter are (4, 7) and (2, y), then the value of y is
(a) 3 (b) -3
(c) 7 (d) 4

12. If the difference of mode and median of a data is 24, then the difference of median and mean is
(a) 12 (b) 24
(c) 08 (d) 36

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13. The values of x and y in the given figure are



(a) 7, 13 (b) 13, 7
(c) 9, 12 (d) 12, 9

14. The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages (in year) of the son and the father are, respectively.
(a) 4 and 24 (b) 5 and 30
(c) 6 and 36 (d) 3 and 24

15. 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) $-\frac{2}{3}$

16. The pair of equations $x+2y+5=0$ and $-3x-6y+1=0$ has
(a) a unique solution (b) exactly two solutions
(c) infinitely many solutions (d) no solution

17. It is given that, $\Delta ABC \sim \Delta EDF$ such that $AB=5$ cm, $AC=7$ cm, $DF=15$ cm and $DE=12$ cm then the sum of the remaining sides of the triangles is
(a) 23.05 cm (b) 16.8 cm
(c) 6.25 cm (d) 24 cm

18. QP is a tangent to a circle with centre O at a point P on the circle. If ΔOPQ is isosceles, then $\angle OQR$ equals.
(a) 30° (b) 45°
(c) 60° (d) 90°

19. **Assertion :** The values of x are $-\frac{a}{2}, a$ for a quadratic equation $2x^2+ax-a^2=0$.

Reason : For quadratic equation $ax^2+bx+c=0$ $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

(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 :** If one zero of poly-nominal $p(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of other, then $k = 2$.
Reason : If $(x - \alpha)$ is a factor of $p(x)$, then $p(\alpha) = 0$ i.e. α is a zero of $p(x)$.

(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).

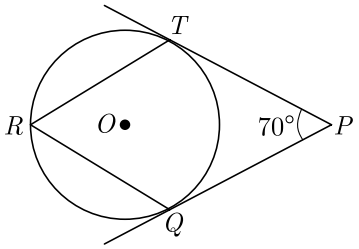
(c) Assertion (A) is true but reason (R) is false.

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

SECTION - B

Section B consists of 5 questions of 2 marks each.

21. In figure, O is the centre of a circle. PT are tangents to the circle from an external point P. If $\angle TPQ = 70^\circ$, find $\angle TRQ$.



22. Find the arithmetic mean of the following frequency distribution :

x_i	3	4	5	7	10
f_i	3	4	8	5	10

OR

Given below is the distribution of weekly pocket money received by students of a class. Calculate the pocket money that is received by most of the students.

Pocket Money (in Rs.)	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Number of students.	2	2	3	12	18	5	2

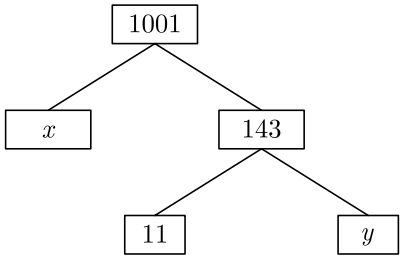
23. Evaluate : $\frac{\cos 45^\circ}{\sec 30^\circ} + \frac{1}{\sec 60^\circ}$

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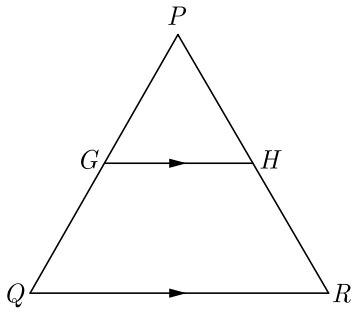
24. a and b are two positive integers such that the least prime factor of a is 3 and the least prime factor of b is 5. Then calculate the least prime factor of $(a+b)$.

OR

What are the values of x and y in the given figure ?



25. In the given figure, G is the mid-point of the side PQ of ΔPQR and $GH||QR$. Prove that H is the mid-point of the side PR or the triangle PQR.



SECTION - C

Section C consists of 6 questions of 3 marks each.

26. Prove that $\dfrac{\sin A - \cos A - 1}{\sin A + \cos A - 1} = \dfrac{1}{\sec A - \tan A}$

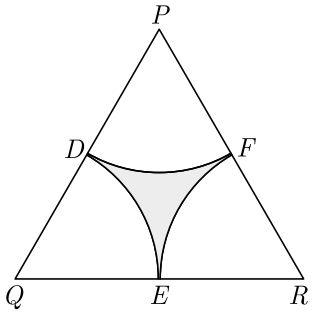
27. Find HCF and LCM of 16 and 36 by prime factorization and check your answer.

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28. Find the area of minor segment of a circle of radius 14 cm, when its centre angle is 60°. Also find the area of corresponding major segment. Use $\pi = \frac{22}{7}$.

OR

In the given figure, ΔPQR is an equilateral triangle of side 8 cm and D, E, F are centres of circular arcs, each of radius 4 cm. Find the area of shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.732$)



29. The table below shows the daily expenditure on food of 25 households in a locality. Find the mean daily expenditure on food.

Daily expenditure (in ₹)	100-150	150-200	200-250	250-300	300-350
Number of households	4	5	12	2	2

30. If the distance of $P(x, y)$ from $A(6, 2)$ and $B(-2, 6)$ are equal, prove that $y = 2x$.

OR

If (a, b) is the mid-point of the segment joining the points $A(10, -6)$ and $B(k, 4)$ and $a - 2b = 18$, find the value of k and the distance AB.

31. If in an AP, the sum of first m terms is n and the sum of its first n terms is m, then prove that the sum of its first $(m + n)$ terms is $-(m + n)$.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Water is flowing at the rate of 15 km/hr through a cylindrical pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time the level of water in pond rise by 21 cm ?

33. For Uttarakhand flood victims two sections A and B of class contributed Rs. 1,500. If the contribution of X-A was Rs. 100 less than that of X-B, find graphically the amounts contributed by both the sections.

OR

Draw the graph of the following equations:

$$2x - y = 1,\ x + 2y = 13$$

Find the solution of the equations from the graph and shade the triangular region formed by the lines and the y-axis.

34. From the top of a 7 m high building the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

OR

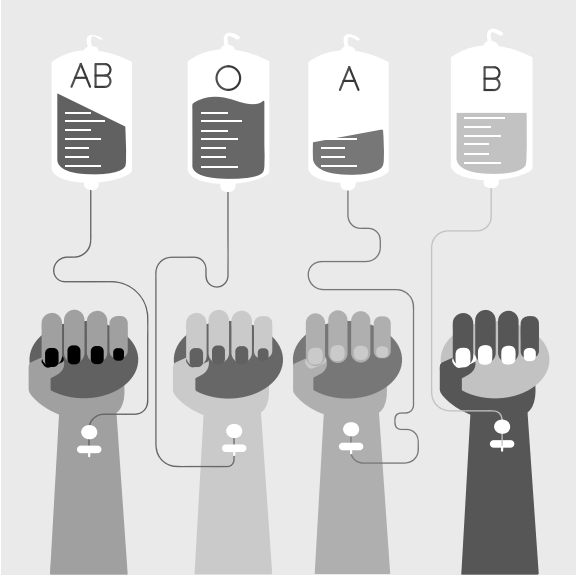
A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (take $\sqrt{3} = 1.732$)

35. Prove that the parallelogram circumscribing a circle is a rhombus.

SECTION - E

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

36. Blood Group : Blood type or blood group is a medical term. It describes the type of blood a person has. It is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells (RBCs). Blood types predict whether a serious reaction will occur in a blood transfusion.



In a sample of 50 people, 21 had type O blood, 22 had type A blood, 5 had type B blood and 2 had type AB blood. Set up a frequency distribution and find the following probabilities.

(i) What is the probability that a person has type O blood ?

(ii) What is the probability that a person has type A or type B blood ?

(iii) What is the probability that a person has neither type A nor type O blood ?

OR

(iv) What is the probability that a person does not have type AB blood ?

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37. Nidhi and Ria are very close friends. Nidhi's parents own a Maruti Alto. Ria's parents own a Toyota Liva. Both the families decide to go for a picnic to Somnath temple in Gujrat by their own cars.



Nidhi's car travels x km/h while Ria's car travels 5 km/h more than Nidhi's car. Nidhi's car took 4 hrs more than Ria's car in covering 400 km.

(i) What will be the distance covered by Ria's car in two hour?

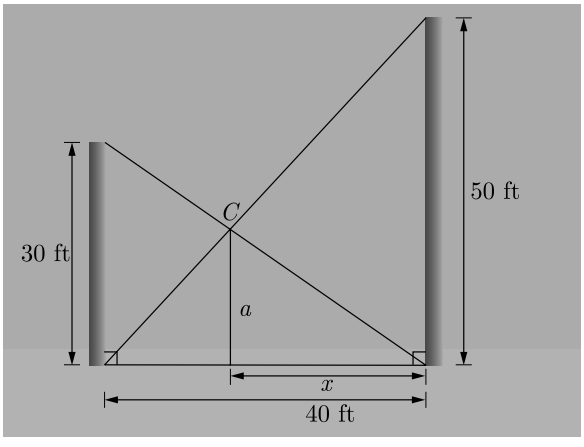
(ii) Write the quadratic equation that describe the speed of Nidhi's car?

(iii) What is the speed of Nidhi's car?

OR

(iv) How much time did Ria take to travel 400 km?

38. Two poles, 30 feet and 50 feet tall, are 40 feet apart and perpendicular to the ground. The poles are supported by wires attached from the top of each pole to the bottom of the other, as in the figure. A coupling is placed at C where the two wires cross.



(i) What is the horizontal distance from C to the taller pole ?

(ii) How high above the ground is the coupling ?

(iii) How far down the wire from the smaller pole is the coupling ?

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