Sample Paper 21

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 AP starts with a positive fraction and every alternate term is an integer. If the sum of the first 11 terms is 33, then the fourth term is

(a) 2 (b) 3

(c) 5 (d) 6

2. Two concentric circles are of radii 10 cm and 8 cm, then the length of the chord of the larger circle which touches the smaller circle is

(a) 6 cm (b) 12 cm

(c) 18 cm (d) 9 cm

3. An observer, 1.5 m tall is 20.5 away from a tower 22 m high, then the angle of elevation of the top of the tower from the eye of observer is

(a) 30° (b) 45°

(c) 60° (d) 90°

4. Volumes of two spheres are in the ratio 64 : 27. The the ratio of their surface areas is

(a) 3 : 4 (b) 4 : 3

(c) 9 : 16 (d) 16 : 9

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5. If ½ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is
(a) 2 (b) -2
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$

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. While computing mean of grouped data, we assume that the frequencies are
(a) Evenly distributed over all the classes
(b) Centred at the class marks of the classes
(c) Centred at the upper limits of the classes
(d) Centred at the lower limits of the classes

8. If an event cannot occur, then its probability is
(a) 1 (b) $\frac{3}{4}$
(c) $\frac{1}{2}$ (d) 0

9. The probability of getting a number greater then 3 in throwing a die is
(a) $\frac{1}{3}$ (b) $\frac{1}{4}$
(c) $\frac{3}{4}$ (d) $\frac{2}{3}$

10. HCF of two numbers is 27 and their LCM is 162. If one of the numbers is 54, then the other number is
(a) 36 (b) 35
(c) 9 (d) 81

11. The distance of the point $(-12, 5)$ from the origin is
(a) 12 (b) 5
(c) 13 (d) 169

12. ΔABC and ΔBDE are two equilateral triangle such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is ..... .
(a) 1 : 4 (b) 4 : 1
(c) 1 : 3 (d) 3 : 1

13. Consider the data:

Class	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Frequency	4	5	13	20	14	7	4

The difference of the upper limit of the median class and the lower limit of the modal class is
(a) 0 (b) 19
(c) 20 (d) 38

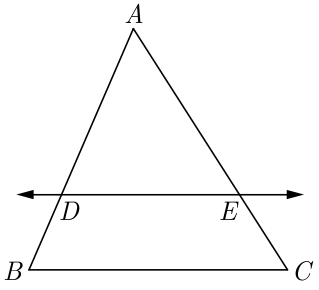
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14. If the angle of depression of an object from a 75 m high tower is 30°, then what is the distance of the object from the tower?

(a) $75\sqrt{2}$ m (b) $75\sqrt{3}$ m

(c) 75 m (d) $75\sqrt{2.5}$ m

15. In Figure, in ΔABC, $DE \parallel BC$ such that $AD = 2.4$ cm, $AB = 3.2$ cm and $AC = 8$ cm, then what is the length of AE?



(a) 4 cm (b) 6 cm

(c) 8 cm (d) 3 cm

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

17. If $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to

(a) $\frac{b}{\sqrt{b^2 - a^2}}$ (b) $\frac{b}{a}$

(c) $\frac{\sqrt{b^2 - a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2 - a^2}}$

18. If one zero of a quadratic polynomial $(kx^2 + 3x + k)$ is 2, then the value of k is

(a) $\frac{5}{6}$ (b) $-\frac{5}{6}$

(c) $\frac{6}{5}$ (d) $-\frac{6}{5}$

19. **Assertion :** If the outer and inner diameter of a circular path is 10 m and 6 m then area of the path is $16\pi\, m^2$.

Reason : If R and r be the radius of outer and inner circular path, then area of path is $\pi(R^2 - r^2)$.

(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.

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20. **Assertion :** $x+y-4=0$ and $2x+ky-3=0$ has no solution if $k=2$.
Reason : $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ are consistent if $\frac{a_1}{a_2}\neq\frac{k_1}{k_2}$.

(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. A bag contains 3 red, 4 green and 5 white candles, one candle is drawn at random from the bag, find the probability that candle is not red.

22. Find the sum of first ten multiple of 5.

OR

If the sum of n terms of an AP is $2n^2+5n$, then find the 4^{th} term.

23. If the points $A(4,3)$ and $B(x,5)$ are on the circle with centre $O(2,3)$, then what is the value of x?

24. From an external point Q, the length of tangent to a circle is 12 cm and the distance of Q from the centre of circle is 13 cm. What is the radius of circle?

OR

QP is a tangent to a circle with centre O at a point P on the circle. If $\Delta\, OPQ$ is isosceles, then find $\angle\, OQR$?

25. Show that $5\sqrt{6}$ is an irrational number.

SECTION - C

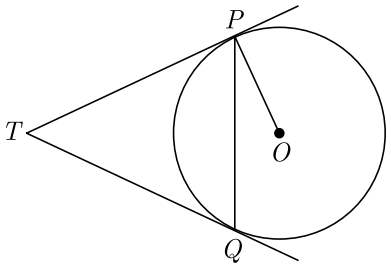
Section C consists of 6 questions of 3 marks each.

26. Prove that : $\sqrt{\frac{1-\cos A}{1+\cos A}}=\operatorname{cosec}A-\cot A$

27. In $\Delta\, ABC$, if X and Y are points on AB and AC respectively such that $\frac{AX}{XB}=\frac{3}{4}$, $AY=5$ and $YC=9$, then state whether XY and BC parallel or not.

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



29. A road which is 7 m wide surrounds a circular park whose circumference is 88 m. Find the area of the road.

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.

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

31. An integer is chosen between 70 and 100. Find the probability that it is
(i) a prime number
(ii) divisible by 7

OR

Find the probability that 5 Sundays occur in the month of November of a randomly selected year.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Show that the points (a, a), $(-a, -a)$ and $\left(-\sqrt{3}\,a, \sqrt{3}\,a\right)$ are the vertices of an equilateral triangle.

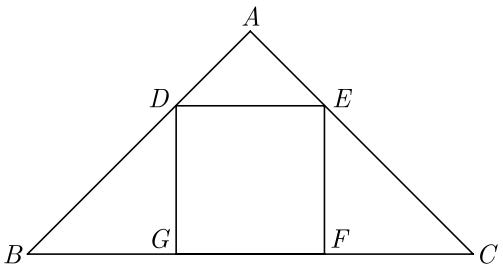
33. Determine graphically the coordinates of the vertices of triangle, the equations of whose sides are given by $2y - x = 8$, $5y - x = 14$ and $y - 2x = 1$.

OR

Aftab tells his daughter, '7 years ago, I was seven times as old as you were then. Also, 3 years from now, I shall be three times as old as you will be.' Represent this situation algebraically and graphically.

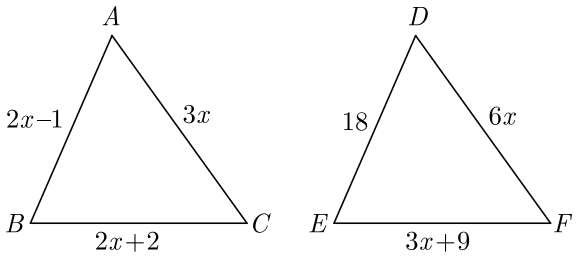
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34. In the given figure, $DEFG$ is a square and $\angle BAC = 90^\circ$. Show that $FG^2 = BG \times FC$.



OR

In Figure, if $\Delta ABC \sim \Delta DEF$ and their sides of lengths (in cm) are marked along them, then find the lengths of sides of each triangle.



35. A toy is in the form of a cylinder of diameter $2\sqrt{2}$ m and height 3.5 m surmounted by a cone whose vertical angle is 90°. Find total surface area of the toy.

SECTION - E

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

36. Electric scooters are plug-in electric vehicles with two or three wheels. The electricity is stored on board in a rechargeable battery, which drives one or more electric motors. Leading manufacturer of electric scooter, Hero Scooter Pvt Ltd wants to declare the mileage of their electric scooters. For this, they recorded the mileage (km/charge) of 50 scooters of the same model. Details of which are given in the following table.

Mileage (km/charge)	100-120	120-140	140-160	160-180
Number of scooters	7	12	18	13

Based on the above information, answer the following questions.

(i) What is the average mileage.

(ii) What is the modal value of mileage ?

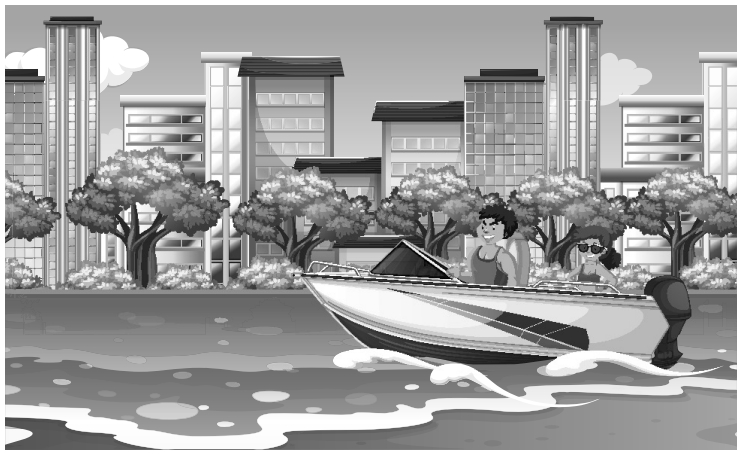
(iii) What is the median value of mileage ?

(iv) What about the mileage can be claimed by the manufacturer for his scooter ?

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37. Climbers have to go $h_2 - h_3 = 63.4$ m to the top. John and Priya went for a small picnic. After having their lunch Priya insisted to travel in a motor boat. The speed of the motor boat was 20 km/hr. Priya being a Mathematics student wanted to know the speed of the current. So she noted the time for upstream and downstream.



She found that for covering the distance of 15 km the boat took 1 hour more for upstream than downstream.

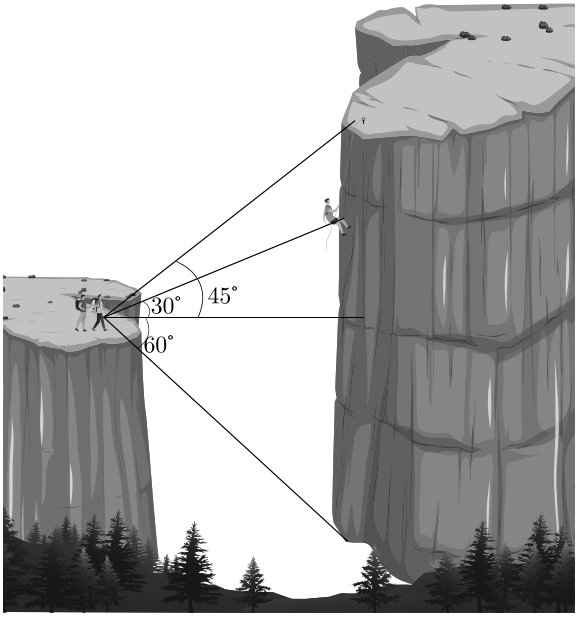
(i) Let speed of the current be x km/hr. What will be the speed of the motorboat in upstream ? What is the relation between speed distance and time?

(ii) Write the correct quadratic equation for the speed of the current ?

(iii) What is the speed of current ? How much time boat took in downstream ?

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38. **Height of a Climber :** Himalayan Trekking Club has just hiked to the south rim of a large canyon, when they spot a climber attempting to scale the taller northern face. Knowing the distance between the sheer walls of the northern and southern faces of the canyon is approximately 150 meter, they attempt to compute the distance remaining for the climbers to reach the top of the northern rim.



Using a homemade transit, they sight an angle of depression of 60° to the bottom of the north face, and angles of elevation of 30° and 45° to the climbers and top of the northern rim respectively.

(i) How high is the southern rim of the canyon?

(ii) How high is the northern rim?

(iii) How much farther until the climber reaches the top?

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