Sample Paper 04

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. A letter of English alphabet is chosen at random, what is the probability that the letter so chosen is a vowel ?

(a) $\frac{5}{26}$ (b) $\frac{21}{26}$

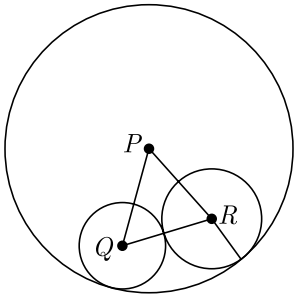
(c) $\frac{2}{13}$ (d) $\frac{7}{13}$

2. If $\tan(3x + 30^\circ) = 1$ then the value of x. will be

(a) 5° (b) 10°

(c) 20° (d) 30°

3. 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:



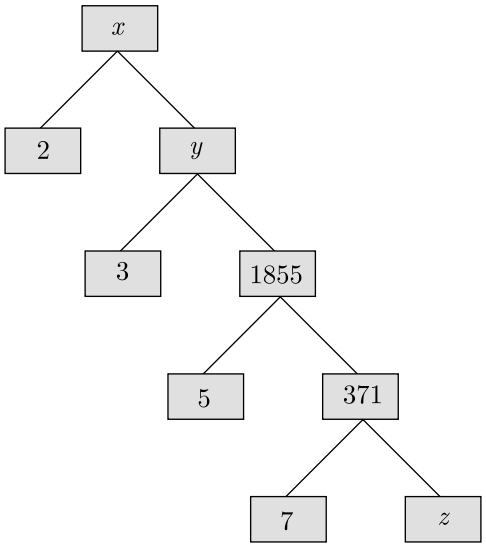
(a) 30 cm
(b) 20 cm
(c) 10 cm
(d) None of these

4. 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

5. In the given factor tree what is the composite number x ?



(a) 53
(b) 11130
(c) 5565
(d) 19438

6. If $am = bl$, then what do you say about the solution of the pair of linear equations $ax + by = c$ and $lx + my = n$?
(a) no solution
(b) unique solution
(c) infinitely solution
(d) can't say anything

7. The corresponding sides of two similar triangles are in the ratio 3 : 4, then the ratio of the areas of triangles is .....
(a) $\frac{1}{3}$
(b) $\frac{1}{9}$
(c) $\frac{9}{16}$
(d) $\frac{3}{4}$

8. If α and β are the zeroes the polynomial $2x^2 - 4x + 5$, the value of $\alpha^2 + \beta^2$ is
(a) -7
(b) 1
(c) -1
(d) -6

Continue on next page.....

9. If α and β are the zeroes the polynomial $2x^2-4x+5$, the value of $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$ is

(a) $\frac{4}{25}$ (b) $-\frac{4}{25}$

(c) $\frac{4}{5}$ (d) $-\frac{4}{5}$

10. $\frac{1-\tan^2\theta}{1+\tan^2\theta}=?$

(a) 1 (b) $\cos^2\theta-\sin^2\theta$

(c) $\sin^2\theta$ (d) $\cos^2\theta$

11. 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

12. For what value of p does the pair of linear equations given below has unique solution ?
$4x+py+8=0$ and $2x+2y+2=0$.

(a) $p=1$ (b) $p=2$

(c) $p\neq 4$ (d) $p\neq 2$

13. The quadratic equation $2x^2-3\sqrt{2}\,x+\frac{9}{4}=0$ has

(a) two distinct real roots (b) two equal real roots

(c) no real roots (d) more than 2 real roots

14. The quadratic equation $3x^2+4\sqrt{3}\,x+4$ has

(a) Two distinct real roots (b) Two equal real roots

(c) No real roots (d) More than 2 real roots

15. The points $(3,0)$, $(6,4)$ and $(-1,3)$ are the vertices of a

(a) equilateral triangle (b) scalene triangle

(c) isosceles triangle (d) right angled isosceles triangle

16. The length of a string between a kite and a point on the ground is 85 m. If the string makes an angle θ with level ground such that $\tan\theta=\frac{15}{8}$, then the height of kite is

(a) 75 m (b) 78.05 m

(c) 226 m (d) None of these

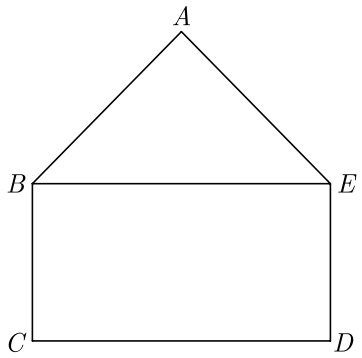
17. From a solid circular cylinder with height 10 cm and radius of the base 6 cm, a right circular cone of the same height and same base is removed, then the volume of remaining solid is

(a) $280\,\pi\text{cm}^3$ (b) $330\,\pi\text{cm}^3$

(c) $240\,\pi\text{cm}^3$ (d) $440\,\pi\text{ cm}^3$

Continue on next page.....

18. In the figure, $ABCDE$ is a pentagon with $BE \parallel CD$ and $BC \parallel DE$. BC is perpendicular to CD. $AB = 5$ cm, $AE = 5$ cm, $BE = 7$ cm, $BC = x - y$ and $CD = x + y$. If the perimeter of $ABCDE$ is 27 cm. The value of x and y, will be



(a) 3 and 2 (b) 2 and 3

(c) 1 and 6 (d) 6 and 1

19. **Assertion :** If a wire of length 22 cm is bent in the shape of a circle, then area of the circle so formed is $40\,\text{cm}^2$.
Reason : Circumference of the circle = length of the wire.

(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 :** $a_n - a_{n-1}$ is not independent of n then the given sequence is an AP.
Reason : Common difference $d = a_n - a_{n-1}$ is constant or independent of n.

(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. 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 $\text{LCM}(p, q) \times \text{HCF}(q, q) = pq$

22. If the mid-point of the line segment joining the points $A(3, 4)$ and $B(k, 6)$ is $P(x, y)$ and $x + y - 10 = 0$, find the value of k.

Continue on next page.....

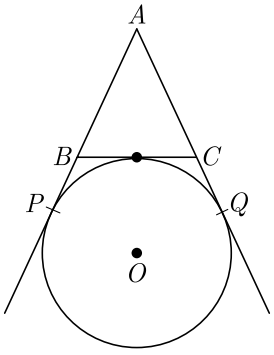
23. Two coins are tossed together. Find the probability of getting both heads or both tails.

24. If the n^{th} term of an AP $-1, 4, 9, 14, ...$ is 129. Find the value of n.

OR

Write the n^{th} term of the AP $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, ...$

25. In figure, AP, AQ and BC are tangents of the circle with centre O. If $AB = 5\,\text{cm}$, $AC = 6$ cm and $BC = 4$ cm, then what is the length of AP?



OR

Two chords AB and CD of a circle intersect at E such that $AE = 2.4\,\text{cm}$, $BE = 3.2\,\text{cm}$ and $CE = 1.6\,\text{cm}$. What is the length of DE?

SECTION - C

Section C consists of 6 questions of 3 marks each.

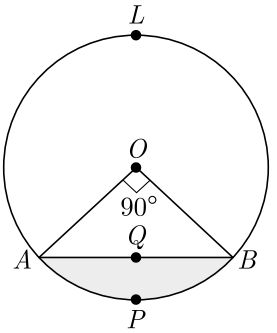
26. Prove that : $\frac{\cot\theta + \text{cosec}\,\theta - 1}{\cot\theta - \text{cosec}\,\theta + 1} = \frac{1 + \cot\theta}{\sin\theta}$

27. Find HCF and LCM of 378, 180 and 420 by prime factorization method. Is HCF $\times$ LCM of these numbers equal to the product of the given three numbers?

28. From a point P, which is at a distant of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR are drawn to the circle, then the area of the quadrilateral $PQOR$ (in cm^2).

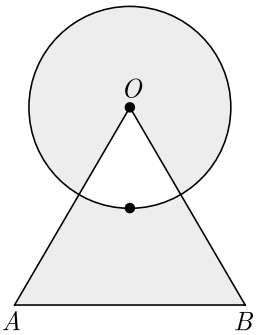
Continue on next page.....

29. In the given figure, a chord AB of the circle with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment $AQBP$. Hence find the area of major segment $ALBQA$. (Use $\pi = 3.14$)

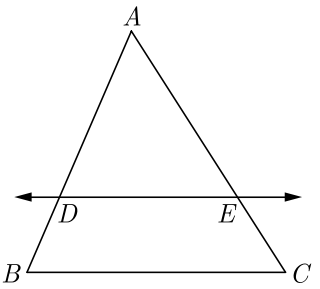


OR

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.



30. 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?



Continue on next page.....

31. A die is thrown once. Find the probability of getting a number which (i) is a prime number (ii) lies between 2 and 6.

OR

A die is thrown twice. Find the probability that
(i) 5 will come up at least once.
(ii) 5 will not come up either time.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. 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.

OR

For what values of a and b does the following pair of linear equations have infinite number of solution?
$2x+3y=7, a(x+y)-b(x-y)=3a+b-2$

33. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.

OR

Find the length of the second diagonal of a rhombus, whose side is 5 cm and one of the diagonals is 6 cm.

34. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pipe, given that 1 cm^3 of iron has approximately 8 g mass. (Use $\pi = 3.14$)

35. Show that $A(-1,0)$, $B(3,1)$, $C(2,2)$ and $D(-2,1)$ are the vertices of a parallelogram $ABCD$.

Continue on next page.....

SECTION - E

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

36. Auditorium, the part of a public building where an audience sits, as distinct from the stage, the area on which the performance or other object of the audience's attention is presented. In a large theatre an auditorium includes a number of floor levels frequently designed as stalls, private boxes, dress circle, balcony or upper circle, and gallery. A sloping floor allows the seats to be arranged to give a clear view of the stage. The walls and ceiling usually contain concealed light and sound equipment and air extracts or inlets and may be highly decorated.



In an auditorium, seats are arranged in rows and columns. The number of rows are equal to the number of seats in each row. When the number of rows are doubled and the number of seats in each row is reduced by 10, the total number of seats increases by 300.

(i) If x is taken as number of row in original arrangement, write the quadratic equation that describes the situation ?

(ii) How many number of rows are there in the original arrangement?

(iii) How many number of seats are there in the auditorium in original arrangement ? How many number of seats are there in the auditorium after re-arrangement.

(iv) How many number of columns are there in the auditorium after re-arrangement?

37. Life insurance is a contract between an insurance policy holder and an insurer or assurer, where the insurer promises to pay a designated beneficiary a sum of money upon the death of an insured person (often the policy holder). Depending on the contract, other events such as terminal illness or critical illness can also trigger payment. The policy holder typically pays a premium, either regularly or as one lump sum.



SBI life insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 years.

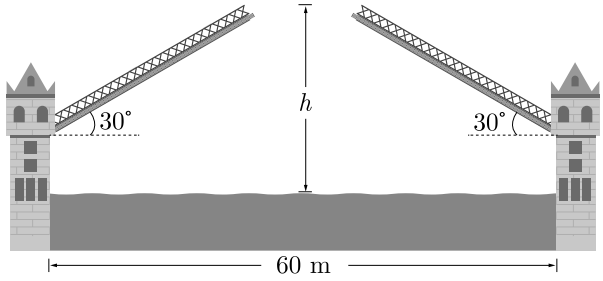
Age (in years)	**Number of policy holders**
Below 20	2
Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	92
Below 55	98
Below 60	100

(i) What is the median value of age ?

(ii) What will be the upper limit of the modal class? What is the mode value of age ?

(iv) Find the mean value of age using empirical relation.

38. Drawbridge : A drawbridge is a bridge that can be moved in order to stop or allow passage across it. Modern drawbridges are often built across large, busy waterways. They can be lifted to allow large ships to pass or lowered to allow land vehicles or pedestrians to cross.



A drawbridge is 60 metre long when stretched across a river. As shown in the figure, the two sections of the bridge can be rotated upward through an angle of 30°.

(i) If the water level is 5 metre below the closed bridge, find the height h between the end of a section and the water level when the bridge is fully open.

(ii) How far apart are the ends of the two sections when the bridge is fully opened, as shown in the figure?

****