



Board Paper of Class 10 2023 Maths (Basic) Delhi(Set 1)

Total Time: 180

Total Marks: 80.0

Section A

Q.No.1: A quadratic polynomial the sum and product of whose zeroes are -3 and 2 respectively, is :

- (a) $x^2 + 3x + 2$
- (b) $x^2 - 3x + 2$
- (c) $x^2 - 3x - 2$
- (d) $x^2 + 3x - 2$

Marks:[1.00]

Q.No.2: (HCF \times LCM) for the numbers 70 and 40 is :

- (a) 10
- (b) 280
- (c) 2800
- (d) 70

Marks:[1.00]

Q.No.3: If the radius of a semi-circular protractor is 7 cm, then its perimeter is :

- (a) 11 cm
- (b) 14 cm
- (c) 22 cm
- (d) 36 cm

Marks:[1.00]

Q.No.4: The number $(5 - 3\sqrt{5} + \sqrt{5})$ is :

- (a) an integer

- (b) a rational number
- (c) an irrational number
- (d) a whole number

Marks:[1.00]

Q.No.5: If $p(x) = x^2 + 5x + 6$, then $p(-2)$ is :

- (a) 20
- (b) 0
- (c) -8
- (d) 8

Marks:[1.00]

Q.No.6: Which of the following **cannot** be the probability of an event?

- (a) 0.1
- (b) $\frac{5}{3}$
- (c) 3%
- (d) $\frac{1}{3}$

Marks:[1.00]

Q.No.7: The pair of linear 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

Marks:[1.00]

Q.No.8: If $\triangle ABC \sim \triangle DEF$ and $\angle A = 47^\circ$, $\angle E = 83^\circ$ then $\angle C$ is equal :

- (a) 47°
- (b) 50°
- (c) 83°
- (d) 130°

Marks:[1.00]

Q.No.9: If the pair of linear equations $x - y = 1$, $x + ky = 5$ has a unique solution $x = 2$, $y = 1$, then the value of k is:

- (a) -2
- (b) -3
- (c) 3
- (d) 4

Marks:[1.00]

Q.No.10: The value of $5 \sin^2 90^\circ - 2 \cos^2 0^\circ$ is:

- (a) -2
- (b) 5
- (c) 3
- (d) -3

Marks:[1.00]

Q.No.11: The length of the arc of a circle of radius 14 cm which subtends an angle of 60° at the centre of the circle is:

- (a) $\frac{44}{3}$ cm
- (b) $\frac{88}{3}$ cm
- (c) $\frac{308}{3}$ cm
- (d) $\frac{616}{3}$ cm

Marks:[1.00]

Q.No.12: The angle of elevation of the top of a 30 m high tower at a point 30 m away from the base of the tower is:

- (a) 30°
- (b) 45°
- (c) 60°
- (d) 90°

Marks:[1.00]

Q.No.13: The mode of the numbers 2, 3, 3, 4, 5, 4, 4, 5, 3, 4, 2, 6, 7 is:

- (a) 2
- (b) 3
- (c) 4
- (d) 5

Marks:[1.00]

Q.No.14: From a well -shuffled deck of 52 playing cards, a card is drawn at random. What is the probability of getting a red queen?

- (a) $\frac{1}{52}$
- (b) $\frac{1}{26}$
- (c) $\frac{1}{13}$
- (d) $\frac{12}{13}$

Marks:[1.00]

Q.No.15: A quadratic equation whose one root is 2 and the sum of whose roots is zero, is:

- (a) $x^2 + 4 = 0$
- (b) $x^2 - 2 = 0$
- (c) $4x^2 - 1 = 0$
- (d) $x^2 - 4 = 0$

Marks:[1.00]

Q.No.16: Which of the following is **not** a quadratic equation?

- (a) $2(x - 1)^2 = 4x^2 - 2x + 1$
- (b) $2x - x^2 = x^2 + 5$
- (c) $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$
- (d) $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$

Marks:[1.00]

Q.No.17: How many tangents can be drawn to a circle from a point on it?

- (a) One
- (b) Two
- (c) Infinite
- (d) Zero

Marks:[1.00]

Q.No.18: The length of the tangent from an external point A to a circle, of radius 3 cm, is 4 cm. The distance of A from the centre of the circle is:

- (a) 7 cm
- (b) 5 cm
- (c) $\sqrt{7}$ cm
- (d) 25 cm

Marks:[1.00]

Q.No.19: Assertion (A): A tangent to a circle is perpendicular to the radius through the point of contact.

Reason (R): The lengths of tangents drawn from an external point to a circle are equal.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) gives the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) does not give 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.

Marks:[1.00]

Q.No.20: Assertion (A): If one root of the quadratic equation $4x^2 - 10x + (k - 4) = 0$ is reciprocal of the other, then value of k is 8.

Reason (R): Roots of the quadratic equation $x^2 - x + 1 = 0$ are real.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) gives the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) does not give 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.

Marks:[1.00]

Section B

Q.No.21: If $\sin \alpha = \frac{1}{2}$, then find the value of $(3 \cos \alpha - 4 \cos^3 \alpha)$.

Marks:[2.00]

Q.No.22: Find the coordinates of the point which divides the join of $A(-1, 7)$ and $B(4, -3)$ in the ratio 2 : 3.

OR

If the points $A(2, 3)$, $B(-5, 6)$, $C(6, 7)$ and $D(p, 4)$ are the vertices of a parallelogram ABCD, find the value of p .

Marks:[2.00]

Q.No.23: Find the roots of the quadratic equation $x^2 - x - 2 = 0$.

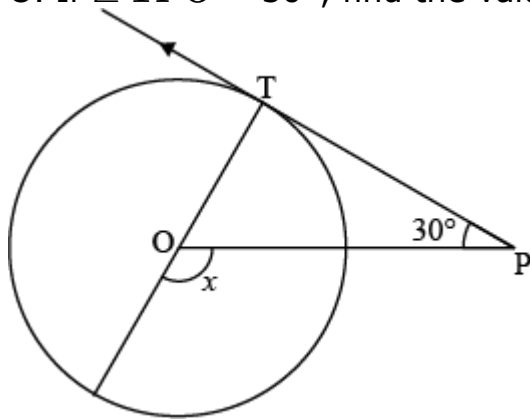
OR

Find the discriminant of the quadratic equation $3x^2 - 2x + \frac{1}{3} = 0$ and hence find the nature of its roots.

Marks:[0.00]

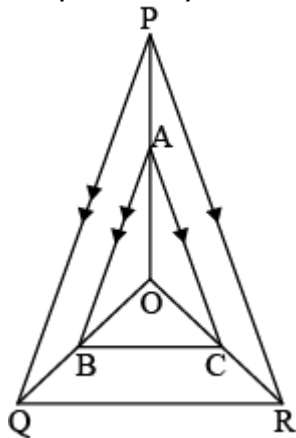
Q.No.24: In the adjoining figure, PT is a tangent at T to the circle with center O. If $\angle TPO = 30^\circ$, find the value of x .

Marks:[2.00]



Q.No.25: In the adjoining figure, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$.

Marks:[2.00]



Section C

Q.No.26: Find the zeroes of the quadratic polynomial $x^2 + 6x + 8$ and verify the relationship between the zeroes and the coefficients.

Marks:[3.00]

Q.No.27: Prove that $\frac{1+\tan^2 A}{1+\cot^2 A} = \sec^2 A - 1$

Marks:[3.00]

Q.No.28: A lending library has a fixed charge for first three days and an additional charge for each day thereafter. Rittik paid ₹27 for a book kept for 7 days and Manmohan paid ₹21 for a book kept for 5 days. Find the fixed charges

and the charge for each extra day.

OR

Find the values of 'a' and 'b' for which the system of linear equations $3x + 4y = 12$, $(a + b)x + 2(a - b)y = 24$ has infinite number of solutions. **Marks:[3.00]**

Q.No.29: A die is rolled once. Find the probability of getting:

- (i) an even prime number.
- (ii) a number greater than 4.
- (iii) an odd number.

Marks:[3.00]

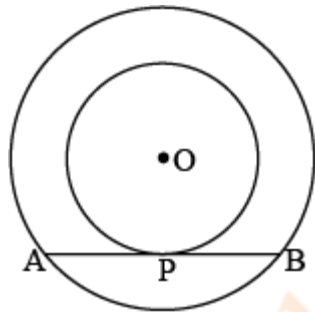
Q.No.30: Find the area of the sector of a circle of radius 7 cm and of central angle 90° . Also, find the area of corresponding major sector. **Marks:[3.00]**

Q.No.31: Prove that the lengths of tangents drawn from an external point to a circle are equal.

OR

Two concentric circles with centre O are of radii 3 cm and 5 cm. Find the length of chord AB of the larger circle which touches the smaller circle at P.

Marks:[3.00]



Section D

Q.No.32: 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° . Determine the height of the tower.

OR

The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it was 60° . Find the height of the tower.

Marks:[0.00]

Q.No.33: Find the sum of first 25 terms of the A.P. whose n^{th} term is given by

$a_n = 5 + 6n$. Also, find the ratio of 20th term to 45th term.

OR

In an A.P., if $S_n = 3n^2 + 5n$ and $a_k = 164$, find the value of k . **Marks:[5.00]**

Q.No.34: The following table gives the monthly consumption of electricity of 100 families:

Monthly Consumption (in units)	130-140	140-150	150-160	160-170	170-180	180-190	190-200
Number of families	5	9	17	28	24	10	7

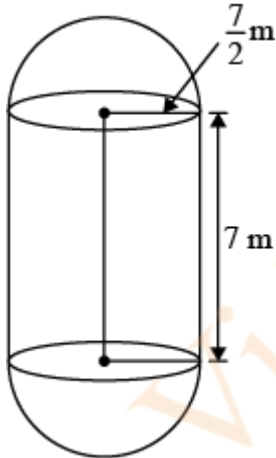
Find the median of the above data.

Marks:[5.00]

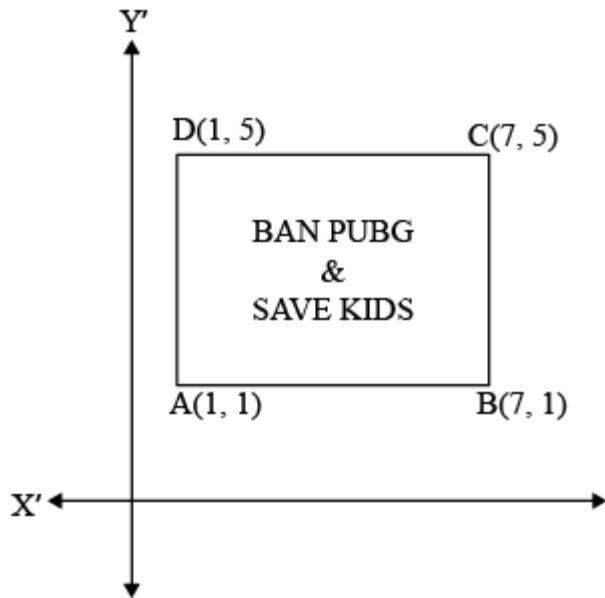
Q.No.35: The boilers are used in thermal power plants to store water and then used to produce steam. One such boiler consists of a cylindrical part in middle and two hemispherical parts at its both ends. Length of the cylindrical part is 7m and radius of cylindrical part is $\frac{7}{2}$ m.

Find the total surface area and the volume of the boiler. Also, find the ratio of the volume of cylindrical part to the volume of one hemispherical part.

Marks:[5.00]



Q.No.36: Use of mobile screen for long hours makes your eye sight weak and give you headaches. Children who are addicted to play "PUBG" can get easily stressed out. To raise social awareness about ill effects of playing PUBG, a school decided to start 'BAN PUBG' campaign, in which students are asked to prepare campaign board in the shape of a rectangle. One such campaign board made by class X student of the school is shown in the figure.



Based on the above information, answer the following questions:

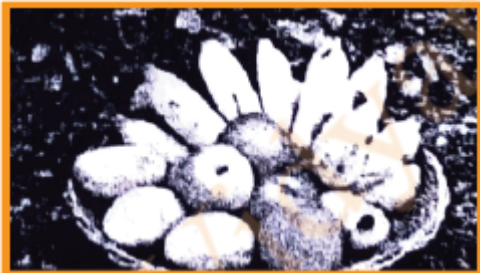
- (i) Find the coordinates of the point of intersection of diagonals AC and BD.
- (ii) Find the length of the diagonal AC.
- (iii) (a) Find the area of the campaign Board ABCD.

OR

- (b) Find the ratio of the length of side AB to the length of the diagonal AC.

Marks:[4.00]

Q.No.37: Khushi wants to organize her birthday party. Being health conscious, she decided to serve only fruits in her birthday party. She bought 36 apples and 60 bananas and decided to distribute fruits equally among all.



Based on the above information, answer the following questions:

- (i) How many guests Khushi can invite at the most?
- (ii) How many apples and bananas will each guest get ?
- (iii) (a) If Khushi decides to add 42 mangoes, how many guests Khushi can invite at the most ?

OR

- (b) If the cost of 1 dozen of bananas is ₹60, the cost of 1 apple is ₹15 and cost of 1 mango is ₹20, find the total amount spent on 60 bananas, 36 apples and 42 mangoes.

Marks:[4.00]

Q.No.38: Observe the figures given below carefully and answer the questions:

Figure A

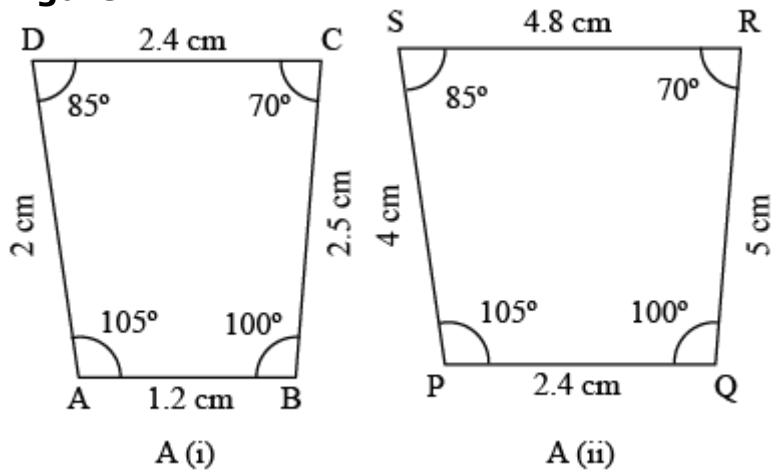


Figure B

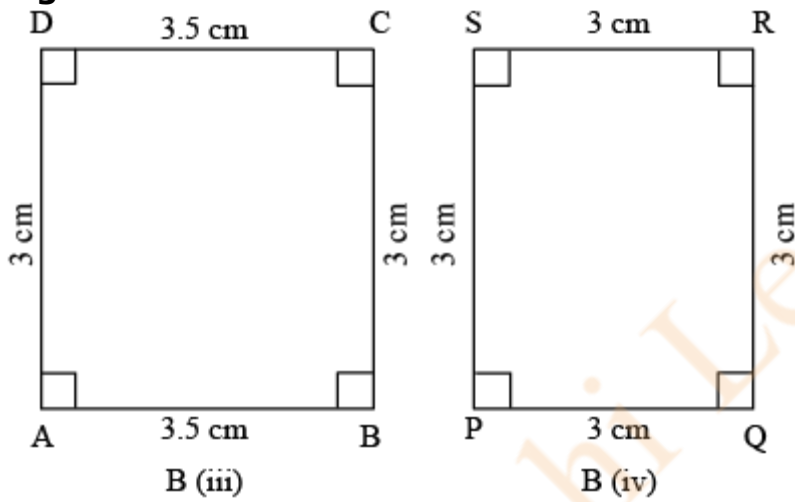
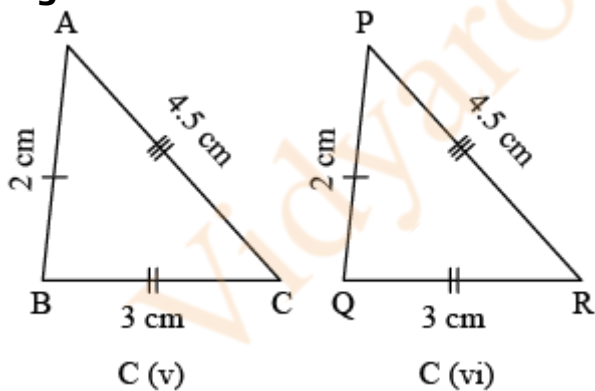


Figure C



- (i) Name the figure(s) wherein two figures are similar.
- (ii) Name the figure(s) wherein the figures are congruent.
- (iii) (a) Prove that congruent triangles are also similar but not the converse.

OR

- (b) What more is least needed for two similar triangles to be congruent?

Marks:[4.00]