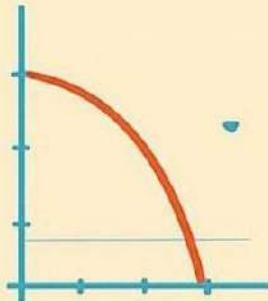




LK Gupta's

**PIONEER EDUCATION**

$$ax^2+bx+c=0$$



10<sup>TH</sup>

$$\sqrt{x}$$

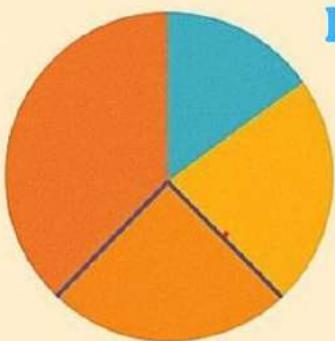
CBSE

$$\pi$$

**MATHS**

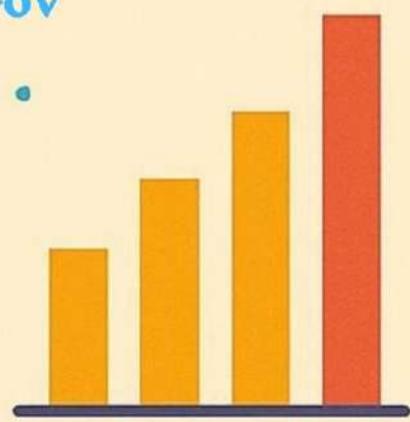
**SAMPLE PAPER**

Issued by Official CBSE Gov



$$A = \pi r^2$$

$$f(x)$$



*“The mind is everything, what you think you become—Buddha.”*

**Time : 3 Hours**

## **Maximum Marks : 80**

### **General Instructions :**

Read the following instructions very carefully and strictly follow them:

- (i) This question paper contains 38 questions. All questions are compulsory.
- (ii) This question paper is divided into five Sections – A, B, C, D and E.
- (iii) In Section – A, Questions No. 1 to 18 are multiple choice questions (MCQs) and questions number 19 and 20 are Assertion – Reason based questions of 1 mark each.
- (iv) In Section – B, Questions No. 21 to 25 are very short answer (VSA) type questions, carrying 2 marks each.
- (v) In Section – C, Questions no. 26 to 31 are Short Answer (SA) type questions carrying 3 marks each.
- (vi) In Section – D, Questions no. 32 to 35 are long answer (LA) type questions carrying 5 marks each.
- (vii) In Section – E, Questions no. 36 to 38 are case study-based questions carrying 4 marks each. Internal choice is provided in 2 marks questions in each case study.
- (viii) There is no overall choice. However, internal choice has been provided in 2 ques in Section – B, 2 questions in Section – C, 2 questions in Section – D and 3 questions in Section – E.
- (ix) Draw neat diagrams wherever required. Take  $\pi = \frac{22}{7}$  wherever required, if not stated.
- (x) Use of calculator is not allowed.

## **SECTION – (A)**

## **Section - (A) Consists of 20 Questions of 1 Mark Each.**

1. If  $a = 2^2 \times 3^x$ ,  $b = 2^2 \times 3 \times 5$ ,  $c = 2^2 \times 3 \times 7$  and  $\text{LCM}(a, b, c) = 3780$ , then  $x$  is equal to  
 (a) 1 (b) 2 (c) 3 (d) 0

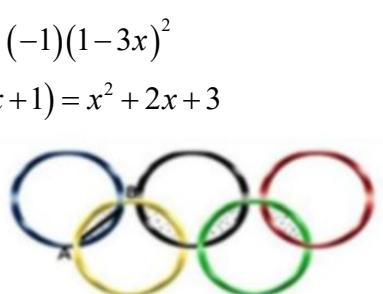
2. The shortest distance (in units) of the point (2,3) from y-axis is :  
 (a) 2 (b) 3 (c) 5 (d) 1

3. If the lines given by  $3x + 2ky = 2$  and  $2x + 5y + 1 = 0$  are not parallel, then  $k$  has to be :  
 (a)  $\frac{15}{4}$  (b)  $\neq \frac{15}{4}$   
 (c) any rational number (d) any rational number having 4 as denominator

4. A quadrilateral ABCD is drawn to circumscribe a circle. If  $BC = 7\text{cm}$ ,  $CD = 4\text{cm}$  and  $AD = 3\text{cm}$ , then the length of AB is  
 (a) 3cm (b) 4cm (c) 6cm (d) 7cm

5. If  $\sec \theta + \tan \theta = x$ , then  $\sec \theta - \tan \theta$  will be  
 (a)  $x$  (b)  $x^2$  (c)  $\frac{2}{x}$  (d)  $\frac{1}{x}$

6. Which one of the following is not a quadratic equation?  
 (a)  $(x+2)^2 = 2(x+3)$  (b)  $x^2 + 3x = (-1)(1-3x)^2$   
 (c)  $x^3 - x^2 + 2x + 1 = (x+1)^3$  (d)  $(x+2)(x+1) = x^2 + 2x + 3$

7. Given is the picture of the Olympic rings made by taking five congruent circles of radius 1cm each, intersecting in such a way that the chord formed by joining the point of intersection of two circles is also of length 1cm. Total area of all the dotted regions (assuming the thickness of the rings to be negligible) is :  




(a)  $4\left[\frac{\pi}{12} - \frac{\sqrt{3}}{4}\right]\text{cm}^2$       (b)  $4\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right]\text{cm}^2$       (c)  $4\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right]\text{cm}^2$       (d)  $8\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right]\text{cm}^2$

**OR**

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

8. A pair of dice is tossed. The probability of not getting the sum eight is :  
 (a)  $\frac{5}{36}$       (b)  $\frac{31}{36}$       (c)  $\frac{5}{18}$       (d)  $\frac{5}{9}$

9. If  $2\sin 5x = \sqrt{3}$ ,  $0^\circ \leq x \leq 90^\circ$ , then  $x$  is equal to :  
 (a)  $10^\circ$       (b)  $12^\circ$       (c)  $20^\circ$       (d)  $50^\circ$

10. The sum of two numbers is 1215 and their HCF is 81, then the possible pairs of such numbers are :  
 (a) 2      (b) 3      (c) 4      (d) 5

11. If the area of the base of a right circular cone is  $51 \text{ cm}^2$  and its volume is  $85 \text{ cm}^3$ , then the height of the cone is given as :  
 (a)  $\frac{5}{6} \text{ cm}$       (b)  $\frac{5}{3} \text{ cm}$       (c)  $\frac{5}{2} \text{ cm}$       (d) 5 cm

12. If zeroes of the quadratic polynomial  $ax^2 + bx + c$  ( $a, c \neq 0$ ) are equal, then :  
 (a)  $c$  and  $b$  must have opposite signs.      (b)  $c$  and  $a$  must have opposite signs.  
 (c)  $c$  and  $b$  must have same signs.      (d)  $c$  and  $a$  must have same signs.

13. The area (in  $\text{cm}^2$ ) of a sector of a circle of radius 21 cm cut off by an arc of length 22 cm is :  
 (a) 441      (b) 321      (c) 231      (d) 221

14. If  $\Delta ABC \sim \Delta DEF$ ,  $AB = 6 \text{ cm}$ ,  $DE = 9 \text{ cm}$ ,  $EF = 6 \text{ cm}$  and  $FD = 12 \text{ cm}$ , then the perimeter of  $\Delta ABC$  is :  
 (a) 28 cm      (b) 28.5 cm      (c) 18 cm      (d) 23 cm

15. If the probability of the letter chosen at random from the letters of the word "Mathematics" to be a vowel is  $\frac{2}{2x+1}$ , then  $x$  is equal to :  
 (a)  $\frac{4}{11}$       (b)  $\frac{9}{4}$       (c)  $\frac{11}{4}$       (d)  $\frac{4}{9}$

16. The points  $A(9, 0)$ ,  $B(9, -6)$ ,  $C(-9, 0)$  and  $D(-9, 6)$  are the vertices of a :  
 (a) Square      (b) Rectangle      (c) Parallelogram      (d) Trapezium

17. The median of a set of 9 distinct observation is 20.5. If each of the observations of a set is increased by 2, then the median of a new set :  
 (a) is increased by 2.  
 (b) is decreased by 2.  
 (c) is two times the original number.  
 (d) Remains same as that of original observations.

18. The length of a tangent drawn to a circle of radius 9 cm from a point at a distance of 41 cm from the centre of the circle is :  
 (a) 40 cm      (b) 9 cm      (c) 41 cm      (d) 50 cm

**DIRECTIONS :** In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

**Choose the correct option :**

(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 and 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.

19. **Assertion (A) :** The number  $5^n$  cannot end with the digit 0, where  $n$  is a natural number.  
**Reason (R) :** A number ends with 0, if its prime factorization contains both 2 and 5.

20. **Assertion (A) :** If  $\cos A + \cos^2 A = 1$ , then  $\sin^2 A + \sin^4 A = 1$ .  
**Reason (R) :**  $\sin^2 A + \cos^2 A = 1$ .

**SECTION - (B)****Section - (B) Consists of 5 Question of 2 Marks Each**

21. The A.P. 8, 10, 12 ..... has 60 terms. Find the sum of last 10 terms.

**OR**

Find the middle term of A.P. 6, 13, 20, ...., 230.

22. If  $\sin(A+B) = 1$  and  $\cos(A-B) = \frac{\sqrt{3}}{2}$ ,  $0^\circ < A, B < 90^\circ$ , find the measure of angles  $A$  and  $B$ .

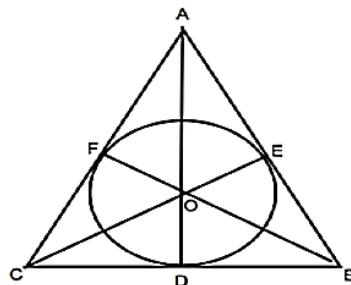
23. If  $AP$  and  $DQ$  are medians of triangles  $ABC$  and  $DEF$  respectively, where  $\Delta ABC \sim \Delta DEF$ , then prove that  $\frac{AB}{DE} = \frac{AP}{DQ}$ .

24. A horse, a cow and a goat are tied, each by ropes of length 14 m, at the corners A, B and C respectively, of a grassy triangular field  $ABC$  with sides of lengths 35 m, 40 m and 50 m. Find the area of grass field that can be grazed by them.

**OR**

Find the area of the major segment (in terms of  $\pi$ ) of a circle of radius 5 cm, formed by a chord subtending an angle of  $90^\circ$  at the centre.

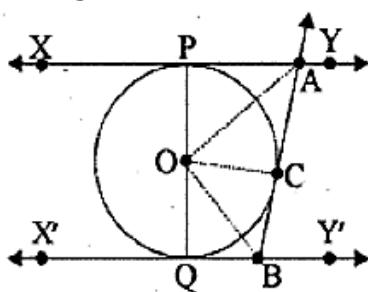
25. A  $\Delta ABC$  is drawn to circumscribe a circle of radius 4 cm such that the segments  $BD$  and  $DC$  are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides  $AB$  and  $AC$ , if it is given that  $ar(\Delta ABC) = 90 \text{ cm}^2$ .

**OR**

A circle is inscribed in a right-angled triangle  $ABC$ , right angled at  $B$ . If  $BC = 7 \text{ cm}$  and  $AB = 24 \text{ cm}$ , find the radius of the circle.

**SECTION - (C)****Section - (C) Consists of 6 Question of 3 Marks Each.**

26. In figure,  $XY$  and  $X'Y'$  are two parallel tangents to a circle with centre  $O$  and another tangent  $AB$  with point of contact  $C$  intersecting  $XY$  at  $A$  and  $X'Y'$  at  $B$ . Prove that  $\angle AOB = 90^\circ$ .

**OR**

Two tangents  $PA$  and  $PB$  are drawn to a circle with centre  $O$  from an external point  $P$ . Prove that :  $\angle APB = 2(\angle OAB)$ .

27. In a workshop, the number of teachers of English, Hindi and Science are 36, 60 and 84 respectively. Find the minimum number of rooms required, if in each room the same number of teachers are to be seated and all of them being of the same subject.

28. Find the zeroes of the quadratic polynomial  $2x^2 - (1+2\sqrt{2})x + \sqrt{2}$  and verify the relationship between the zeroes and coefficients of the polynomial.

29. If  $\sin \theta + \cos \theta = \sqrt{3}$ , then prove that :  $\tan \theta + \cot \theta = 1$ .

**OR**

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

30. On a particular day, Vidhi and Unnati couldn't decide on who would get to drive the car. They had one coin each and flipped their coin exactly three times. The following was agreed upon :

1. If Vidhi gets two heads in a row, she would drive the car.
2. If Unnati gets a head immediately followed by a tail, she would drive the car.

Who has greater probability to drive the car that day? Justify your answer.

31. The monthly income of Aryan and Babban are in the ratio 3 : 4 and their monthly expenditures are in ratio 5 : 7. If each saves Rs. 15,000 per month, find their monthly incomes.

**OR**

Solve the following system of equations graphically :  $2x + y = 6$ ,  $2x - y - 2 = 0$ . Find the area of the triangle so formed by two lines and  $x$ -axis.

**OR**

Five years hence, fathers age will be three times the age of son. Five years ago, father was seven times as old as his son. Find their present ages.

### SECTION - (D)

#### Section - (D) Consists of 4 Question of 5 Marks Each.

32. A train travels at a certain average speed for a distance of 63km and then travels at a distance of 72km at an average speed of 6km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is the original average speed?

33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.  
Hence in  $\Delta PQR$ , prove that a line  $\ell$  intersects the sides PQ and PR of a  $\Delta PQR$  at L and M respectively such that  $LM \parallel QR$ . If  $PL = 5.7\text{cm}$ ,  $PQ = 15.2\text{cm}$  and  $MR = 5.5\text{cm}$ , then find the length of  $PM$  (in cm)

34. From a solid right circular cone, whose height is 6cm and radius of base is 12cm, a right circular cylindrical cavity of height 3cm and radius 4cm is hollowed out such that bases of cone and cylinder form concentric circles. Find the surface area of the remaining solid in terms of  $\pi$ .

**OR**

An empty cone of radius 3cm and height 12cm is filled with ice-cream such that the lower part of the cone which is  $(1/6)$ th of the volume of the cone is unfilled (empty) but a hemisphere is formed on the top. Find the volume of the ice-cream.

35. If the mode of the distribution is 55, then find the value of  $x$ . Hence, find the mean.

Class interval	0 - 15	15 - 30	30 - 45	45 - 60	60 - 75	75 - 90
Frequency	10	7	$x$	15	10	12

**OR**

A survey regarding the height (in cm) of 51 girls of class X of a school was conducted and the following data was obtained

Less than:	140	145	150	155	160	165
No. of Girls:	4	11	29	40	46	51

Find the median height of the girls. If mode of the above distribution is 148.05, find the mean using empirical formula.

**SECTION - (E)****Section - (E) Consists of 3 case study-based Questions of 4 Marks Each.**

36. In a class, the teacher asks every student to write an example of A.P. Two boys Aryan and Roshan writes the progression as  $-5, -2, 1, 4, \dots$  and  $187, 184, 181, \dots$  respectively. Now the teacher asks his various students the following questions on progression. Help the students to find answers for the following:

- Find the sum of the common difference of two progressions.
- Find the 34th term of progression written by Roshan.
- Find the sum of first 10 terms of the progression written by Aryan.

**OR**

Which term of the progressions will have the same value?

37. A group of class X students goes to picnic during winter holidays. The position of three friends Aman, Kirti and Chahat are shown by the points P, Q and R

- Find the distance between P and R.
- Is Q the midpoint of PR? Justify by finding midpoint of PR.
- Find the point on x-axis which is equidistant from P and Q.

**OR**

Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.

**OR**

A group of class X students goes to picnic during winter holidays. Aman, Kirti and Chahat are three friends. The position of three friends Aman, Kirti and Chahat are shown by the points P, Q and R. The co-ordinates of P (2,5), Q (4,4) and R (8,3) are given.

- Find the distance between P and R.
- Is Q the midpoint of PR? Justify by finding midpoint of PR.
- Find the point on x-axis which is equidistant from P and Q.

**OR**

Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.

38. India gate (formerly known as All India war memorial) is located near Karthavya path. (formerly Rajpath) at New Delhi. It stands as a memorial to 74187 soldiers of Indian Army, who gave their life in the first world war. This 42m tall structure was designed by Sir Edwin Lutyens in the style of Roman triumphal arches. A student Shreya of height 1 m visited India Gate as a part of her study tour.

- What is the angle of elevation from Shreya's eye to the top of India Gate, if she is standing at a distance of 41m away from the India Gate?
- If Shreya observes the angle of elevation from her eye to the top of India Gate to be  $60^\circ$ , then how far is she standing from the base of the India Gate?
- If the angle of elevation from Shreya's eye changes from  $45^\circ$  to  $30^\circ$ , when she moves some distance back from the original position. Find the distance she moves back.

**OR**

If Shreya moves to a point which is at a distance of  $\frac{41}{\sqrt{3}}$  m from the India Gate, then find the angle of elevation made by her eye to the top of India Gate.