



ANGEL'S PUBLIC SCHOOL

HALF YEARLY EXAMINATION

(SAMPLE PAPER)

SESSION 2026 – 27

SUBJECT : MATHEMATICS

GRADE – X

TIME : 03 HRS

M.M:80

General Instructions:

Read the following instructions carefully and follow them:

- This question paper contains 38 questions. All Questions are compulsory.
- This Question Paper is divided into 5 Sections A, B, C, D and E.
- In Section A, Question numbers 1–18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion– Reason based questions of 1 mark each.
- In Section B, Question numbers 21–25 are very short answer (VSA) type questions, carrying 02 marks each.
- In Section C, Question numbers 26–31 are short answer (SA) type questions, carrying 03 marks each.
- In Section D, Question numbers 32–35 are long answer (LA) type questions, carrying 05 marks each.
- In Section E, Question numbers 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.
- There is no overall choice. However, an internal choice in 2 questions 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.
- Draw neat and clean figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
- Use of calculators is not allowed.

SECTION – A

Section – A has 20 multiple choice questions carrying 1 mark each.

(20x1=20)

1. The HCF of 960 and 432 is ____.

- (a) 48 (b) 54 (c) 72 (d) 36

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 $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are not parallel, then the value of k is ____.

- (a) $\frac{15}{4}$ (b) $\frac{15}{4}$
(c) any rational number (d) any rational number having 4 as denominator

4. The polynomial whose zeroes are $2+\sqrt{3}$ and $2-\sqrt{3}$ is _____.
 (a) x^2+4x-1 (b) x^2+4x+1 (c) x^2-4x+1 (d) x^2-4x-1
5. The non zero root of $5x^2-4x=0$ is _____.
 (a) $\frac{4}{5}$ (b) $\frac{5}{4}$ (c) $\frac{5}{16}$ (d) $\frac{16}{5}$
6. Which one of the following is not a quadratic equation?
 (a) $(x+2)^2=2(x+3)$ (b) $(x+3)^3=2(x-3)$ (c) $(x-2)^3=x^3+3x$ (d) $(x-2)^3=x(x^2+2)$
7. The 17th term of an AP exceeds the 10th term by 14. Then the common difference of the A.P is ____.
 (a) -1 (b) 1 (c) -2 (d) 2
8. A pair of dice is tossed. The probability of not getting the sum of digits eight is _____.
 (a) $5/36$ (b) $31/36$ (c) $5/18$ (d) 5
9. Find the value of k for which the pair of linear equations $kx+3y=k-2$ and $12x+ky=k$ has no solution.
 (a) 6 (b) -6 (c) $6, -6$ (d) 2
10. The coordinates of the point which divides the join of $(-1,7)$ and $(4,-3)$ in the ratio 2: 3 is _____.
 (a) $(2,3)$ (b) $(1,3)$ (c) $(3,1)$ (d) $(3,2)$
11. The common difference of the A.P:
 $\sqrt{2}, 2\sqrt{2}, 3\sqrt{2}, 4\sqrt{2} \dots$ is _____.
 (a) $\sqrt{2}$ (b) 1 (c) $2\sqrt{2}$ (d) $-\sqrt{2}$
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 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
14. If $\triangle ABC \sim \triangle DEF$, $AB=6\text{cm}$, $DE=9\text{cm}$, $EF=6\text{cm}$ and $FD=12\text{cm}$, then the perimeter of $\triangle ABC$ is
 (a) 28cm (b) 28.5cm (c) 18cm (d) 23cm
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) 4 (b) 9 (c) 11 (d) 49

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 perimeter of a rectangular garden is 180 meters. If the length of the garden is 10 meters more than its width, what will be the area of the garden?

- (a) 40 m (b) 50 m (c) 50 sq m (d) 2000 sq m

18. If the lines given by $3x+2ky=2$ and $2x+5y+1=0$ are parallel, then the value of k is ____.

- (a) $-\frac{5}{4}$ (b) $\frac{2}{5}$ (c) $\frac{15}{4}$ (d) $\frac{3}{2}$

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):** The common difference of the A.P. $(-5, -1, 3, 7, \dots)$ is 4.

Reason (R): The common difference (d) of an A.P. is obtained by subtracting any term from its preceding term, i.e., $d = a_n - a_{n-1}$.

SECTION – B

This Section has 5 very short answer type questions carrying 2 marks each.

(5x2=10)

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

OR

Find the middle term of A.P 6, 13, 20,, 2302

22. Prove that $3+2\sqrt{5}$ is an irrational number.

23. If AP and DQ are medians of triangles ABC and DEF respectively, where

$\triangle ABC \sim \triangle DEF$, then prove that $AB/DE = AP/DQ$

24. Find the value of k for which the pair of linear equations $kx+3y= k-2$ and $12x +ky= k$ has no solution.

OR

Find the values of p and q for the linear equations: $4x+5y= 2$ and

$$(2p+7q)x+(p+8q)y = 2q-p+1$$

25. Find the roots of the quadratic equation:

$$\sqrt{2}x^2+7x+5\sqrt{2}=0$$

SECTION – C

This Section has short answer type questions carrying 3 marks each.

(6x3=18)

26. Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.

OR

Check whether -150 is a term of the A.P:

$$3, 1, -1, -3, -5, \dots$$

27. In a workshop, the number of teachers of English, Hindi and Science are 36, 60 and 84 respectively.

Find the minimum number of the rooms required, if same number of teachers are to be seated in each room and teachers in a room belong to 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.

OR

By increasing the price of a book by Rs 10, a person can buy 10 less books for Rs 1200. Find the original list price of the book.

29. Show that $A(-3, 2)$, $B(-5, -5)$, $C(2, -3)$ and $D(4, 4)$ are the vertices of a rhombus.

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

(a) If Vidhi gets two heads in a row, she would drive the car

(b) 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 ₹ 15,000 per month, find their monthly incomes.

OR

(A) Solve the following system of equations graphically:

$$2x + y = 6, 2x - y - 2 = 0.$$

SECTION – D

This Section has 4 long answer type questions carrying 5 marks each. (4×5=20)

- 32.** A train travels 180 Km at a uniform speed. If the speed had been 9Km/hr more, it would have taken 1 hour less for the same journey. Find the speed of the train.
- 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 ΔPQR , prove that a line ℓ intersects the sides PQ and PR of a ΔPQR at L and M respectively such as $LM \parallel QR$. 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.** Find the ratio in which the line segment joining the points A(3,−3) and B(−2,7) is divided by the x–axis. Also find the coordinates of the point of division.

OR

Prove that the points P (a, b+c) , Q (b, c+a) and R (c, a+b) are collinear.

- 35.** A boy of height 120 cm is walking away from the base of a lamp post at a speed of 87m/minute. If the lamp post is 36 m above the ground, find the length of his shadow after 3 minutes.

OR

If a line through one vertex of a triangle divides the opposite side in the ratio of the other two sides, then the line bisects the angle at the vertex.

SECTION – E

This Section has 3 case study–based questions carrying 4 marks each. (3×4=12)

- 36.** In a class, the teacher asks every student to write an example of A.P. Two boys Aryan and Roshan, wrote the progression as −5, −2, 1, 4, and 187, 184, 181, respectively. Now the teacher asks his various students the following questions based on the progression.

- (a) Find the sum of the common difference of two progressions. (1)
- (b) Find the 34th term of the progression written by Roshan. (1)
- (c) Find the sum of the first 10 terms of the progression written by Aryan. (2)

OR

Which term of the progressions will have the same value?

37. A group of class X students goes on a 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.

- (a) Find the distance between the points P and R. (1)
- (b) Is Q the midpoint of PR? Justify by finding the midpoint of PR. (1)
- (c) Find the point on the x-axis which is equidistant from P and Q. (2)

OR

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

38. A seminar is being conducted by an Educational Organisation, where the participants will be the educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

- (a) In each room the same number of participants are to be seated and all of them being in the same subject. Find the maximum number of participants that can be accommodated in each room. (1)
- (b) Find the minimum number of rooms required during the event. (1)
- (c) Find the LCM of 60, 84 and 108. (2)

OR

Find the product of HCF and LCM of 60,84 and 108 .