Strive for Perfection

ANGEL'S PUBLIC SCHOOL

SAMPLE PAPER

HALF YEARLY EXAM SESSION 2025 – 26

CLASS – X

TIME: 3 HRS **SUBJECT : MATHEMATICS** **M.M:80**

General Instructions:

Read the following instructions carefully and follow them:

(a) This question paper contains 38 questions.

(b) This Question Paper is divided into 5 Sections A, B, C, D and E.

(c) 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.

(d) In Section B, Questions no. 21–25 are very short answer (VSA) type questions, carrying 02 marks each.

(e) In Section C, Questions no. 26–31 are short answer (SA) type questions, carrying 03 marks each.

(f) In Section D, Questions no. 32–35 are long answer (LA) type questions, carrying 05 marks each.

(g) 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.

(h) 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.

SECTION – A

I. Choose the correct option:

1. The HCF of 72 and 120 is:

(a) 12 (b) 24 (c) 36 (d) 48

2. If the sum and product of the roots of the equation $kx^2+6x+4k= 0$ are equal, then k= ___.

(a) –3/2 (b) 3/2 (c) ⅔ (d) –⅔

3. The fourth term from the end of the AP :–11,–8,–5…..,49 is:

(a) 37 (b) 40 (c) 43 (d) 58

4. If the first term of the A.P is –5 and the common difference is 2, then the sum of first 6 terms is ___.

(a) 0 (b) 5 (c) 6 (d) 15

5. If the equations represent parallel lines, then the system has:

(a) unique solution (b) infinitely many solutions

(c) no solution (d) trivial solution

6. The value of k for which the system of equations x+2y= 5 and 3x+ky+15=0 has no solution is:

(a) 4 (b) 5 (c) 6 (d) 7

7. The zeroes of the quadratic polynomial $x^2+25x+156$ are

(a) Both positive (b) Both negative (c) One positive and one negative (d) None of these

8. The greatest number which when divides 1251,9377 and 15628 leaves remainder 1,2 and 3 respectively is ___.

(a) 575 (b) 450 (c) 750 (d) 625

9. Largest number which exactly divides 285 and 1249 leaving remainders 9 and 7, respectively is:

(a) 136 (b) 138 (c) 140 (d) 144

10. Points A(–1,y) and B(5,7) lie on a circle with centre O(2,–3y) .The values of y are

(a) 1,–7 (b) –1,7 (c) 2,7 (d) –2,–7

11. Which of the following is used in proving triangles similar?

(a) Pythagoras theorem (b) SSS similarity (c) RHS congruence (d) None of these

12. In similar triangles, the ratio of their areas is equal to the square of the ratio of their

(a) perimeters (b) medians (c) corresponding sides (d) altitude

13. Three vertices of a parallelogram ABCD are A (1,4),B(–2,3) and C(5,8). The ordinante of the fourth vertex D is

(a) 8 (b) 9 (c) 7 (d) 6

14. The coordinates of the midpoint of the line segment joining (2, 3) and (4, 7) are

(a) (2,5) (b) (3,5) (c) (4,7) (d) (6,10)

15. A bag contains 5 red, 4 green, and 3 blue balls. If one ball is drawn at random, what is the probability that it is not green?

(a) 3/12 (b) 5/12 (c) 2/3 (d) 7/12

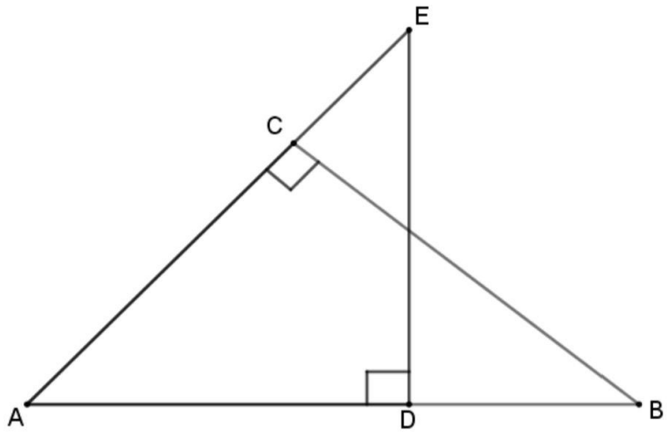
16. In a lottery of 100 tickets numbered 1 to 100, a ticket is drawn at random. What is the probability that the number is divisible by both 2 and 5?

(a) 1/5 (b) 1/10 (c) 1/20 (d) ¼

17. If $A(3,\sqrt{3})$,B (0,0) and C(3,k) are the vertices of an equilateral triangle ABCD, then the value of k is __.

(a) 2 (b) –3 (c) $-\sqrt{3}$ (d) $-\sqrt{2}$

18. In the given figure, $\triangle ADE$ is similar to :



(a) $\triangle$ BAC (b) $\triangle$BCA (c) $\triangle$CAB (d) $\triangle$ CBA

DIRECTION: 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): HCF of any two consecutive even natural numbers is always 2.

Reason (R): Even natural numbers are divisible by 2.

20. Assertion (A): If Roots of the quadratic equation $3x^2-5x+2=0$ are equal

Reason(R) A quadratic equation in the variable x is an equation of the type $ax^2+bx+c=0$, where a,b,c, are real numbers.

SECTION – B

21. Find the H.C.F and L.C.M of 480 and 720 using the Prime factorisation method.

OR

The H.C.F of 85 and 238 is expressible in the form 85m –238. Find the value of m.

22. (i) Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find the probability that the product of numbers obtained is an odd number

OR

(ii) How many positive three digit integers have the hundredths digit 8 and unit's digit 5? Find the probability of selecting one such number out of all three digit numbers.

23. Find the value of the middle term of the following A.P: –6,–2,2……58.

24. Find the points on the x–axis which is at a distance of $\sqrt{41}$ units from the point (8, –5).

25. Show that the points A(–5,6), B(3, 0) and C(9, 8) are the vertices of an isosceles triangle

SECTION – C

26. The sum of two numbers is 18 and the sum of their reciprocals is 9/40. Find the numbers.

27. (i) Find the zeroes of the quadratic polynomial: $x^2+10x+25$.

OR

(ii) In a triangle ABC,D and E are points on the sides AB and AC respectively such that DE ||BC. If AD= 2.5 cm, BD= 3 cm, AE= 3.75 cm, find the length of AC.

28. Solve for x and y:

$x+y= a–b$

$ax–by= a^2–b^2$

29. Which term of the A.P :3,15,27,39….will be 132 more than its 54th term?

30. (i) Do the points (3,2),(–2,–3) and (2,3) form a triangle? If so ,name the type of the triangle formed.

OR

(ii) What is the nature of the roots of the quadratic equation $3x^2–5x+2=0$?

31. Prove that $\sqrt{3}$ is an irrational number.

SECTION – D

32. (a) A number consisting of two digits is seven times the sum of its digit. When 27 is subtracted from the number, the digits are reversed. Find the number.

OR

(b) Find the value of p, for which one root of the root of the quadratic equation $px^2–14x+8= 0$ is 6 times the other.

33. Given that $\sqrt{2}$ is an irrational number, show that $5+3\sqrt{2}$ is an irrational number.

34. If –5 is a root of the quadratic equation,$2x^2+px–15=0$ and the quadratic equation $p(x^2+x)+k=0$ has equal roots,find the value of k.

35. (a) If the 9th term of an AP is zero, prove that it's 29th term is twice it's 19th term.

OR

(b) Show that the points (1,7) ,(4,2), (–1,–1) and (–4,4) are the vertices of a square.

SECTION – E

36. Ms. Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer.On the basis of the above situation answer the following questions:

(i) Write an A.P whose terms represent the number of jars in different layers starting from top. Also, find the common difference.

(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer.

(iii) If there are 'n' number of rows in a layer then find the expression for finding the

total number of jars in terms of n. Hence find S_8 .

OR

(iv) The shopkeeper added 3 jars in each layer. How many jars are there in the 5th

layer from the top?

37. To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections–section A and section B of grade X. There are 32 students in section A and 36 students in section B.

Based on the above information, answer the following questions.

(i) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?

(a) 144 (b) 128 (c) 288 (d) 272

(ii) If the product of two positive integers is equal to the product of their HCF and LCM is true then the HCF (32,36) is

(a) 2 (b) 4 (c) 6 (d) 8

(iii) 36 can be expressed as a product of its primes as

(a) $2^2 \times 3^2$ (b) 2×3^3 (c) $2^3 \times 3^1$ (d) $2^0 \times 3^0$

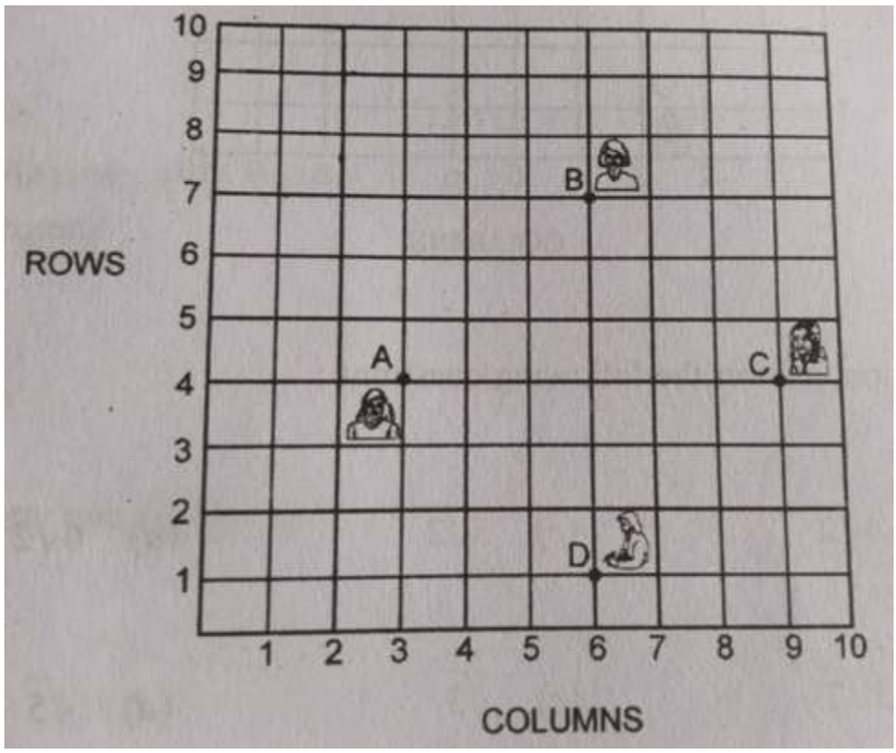
OR

(iv) $7 \times 11 \times 13 \times 15 + 15$ is a

(a) prime number (b) composite number

(c) neither prime nor composite (d) none of the above

38. In a classroom,4 friends are seated at the points A,B,C and D.



Based on the above information, answer the following questions:

(i) Length of AB is :

(a) $3\sqrt{2}$ (b) $4\sqrt{2}$ (c) $5\sqrt{2}$ (d) $6\sqrt{2}$

(ii) Length of BC is:

(a) $4\sqrt{2}$ (b) $3\sqrt{2}$ (c) $5\sqrt{2}$ (d) $6\sqrt{2}$

(iii) Length of AC is

(a) 4 (b) 5 (c) 6 (d) 7

OR

Perimeter of ABCD is :

(a) 8 units (b) 10 units (c) $12\sqrt{2}$ units (d) 14 units