Applied Academy

H-86 sector-22 Noida

MATHS X CHAPTER 2,3,4,5

Class 10 - Mathematics

Section A

1. The number of polynomials having zeroes -3 and 5 is: **[1]**

   a) infinite   b) at most two

   c) only one   d) exactly two

2. The number polynomials having zeroes as -2 and 5 is **[1]**

   a) 1   b) 2

   c) 3   d) more than 3

3. 5 years hence, the age of a man shall be 3 times the age of his son while 5 years earlier the age of the man was 7 times the age of his son. The present age of the man is **[1]**

   a) 50 years   b) 45 years

   c) 47 years   d) 40 years

4. Solve for x and y in the following question. **[1]**
   $\frac{2}{x+2y} + \frac{1}{2x-y} + \frac{5}{9} = 0, \frac{9}{x+2y} + \frac{6}{2x-y} + 4 = 0$

   a) x = 2, y = 1   b) x = 1, y = 2

   c) x = 2, y = $\frac{1}{2}$ d) x = $\frac{1}{2}$, y = 2

5. If the equation $x^2 + 5kx + 16 = 0$ has no real roots then **[1]**

   a) $k > \frac{8}{5}$ b) $k < \frac{-8}{5}$

   c) $\frac{-8}{5} < k < \frac{8}{5}$ d) None of these

6. A quadratic equation $ax^2 + bx + c = 0$ has real and equal roots, if **[1]**

   a) $b^2 - 4ac = 0$ b) $b^2 - 4ac < 0$

   c) $b^2 - 4ac > 0$ d) None of these

7. The sum of first 16 terms of the AP 10, 6, 2, ... is **[1]**

   a) -400   b) 320

   c) -320   d) 352

8. If 7th and 13th terms of an A.P. be 34 and 64 respectively, then its 18th term is **[1]**

   a) 90   b) 87

   c) 89   d) 88

9. **Assertion (A):** A quadratic polynomial with zeroes 2, 3 and -3 is $x^2 - 5x + 6$. **[1]**

Reason (R): If α and β are zeroes of a quadratic polynomial then polynomial is given by $x^2 - (\alpha + \beta)x + \alpha\beta$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

10. **Assertion (A):** Lines represented by equations $x + y = 3$ and $2x + 2y = 12$ are parallel lines. **[1]**

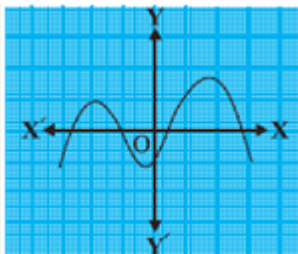**Reason (R):** System of coincident lines and intersecting lines is known as consistent.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

11. **Assertion (A):** If roots of the equation $x^2 - bx + c = 0$ are two consecutive integers, then $b^2 - 4c = 1$ **[1]**

Reason (R): If a, b, c are odd integer then the roots of the equation $4abc\, x^2 + (b^2 - 4ac) x - b = 0$ are real and distinct.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

12. **Assertion (A):** Sum of first n terms in an A.P. is given by the formula: $S_n = 2n \times [2a + (n - 1)d]$ **[1]**

Reason (R): Sum of first 15 terms of 2 , 5 , 8 ... is 345.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

13. For a polynomial p(x), the graph of y = p(x) is given below. Find the number of zeroes of p(x). **[1]**

14. Form a quadratic polynomial, one of whose zero, is $2 + \sqrt{5}$ and the sum of zeroes is 4. **[1]**

15. Check whether the point (a, - a) lies on $y = x - a$ or not. **[1]**

16. Without drawing the graph, find out wheather the lines representing the following pair of linear equations intersect at a point, are parallel or coincident. **[1]**

$18x - 7y = 24$; $\frac{9}{5}x - \frac{7}{10} = \frac{9}{10}$

17. Is it a quadratic equation? **[1]**

$x^2 - 5x + 3 = 0$

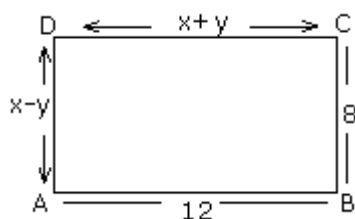18. Write the quadratic equation in x whose roots are 2 and -5. **[1]**

19. If $\frac{3}{5}$, a, 4 are three consecutive terms of an A.P., then find the value of a. **[1]**

20. Does the sequence –1, –1, –1, –1, ... form an AP? Justify your answer. **[1]**

Section B

21. For what value of k, is - 3 a zero of the polynomial $x^2 + 11x + k$? **[2]**

22. Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and the coefficients. **[2]**

23. The taxi charges in a city comprise of a fixed charge together with the charge for the distance covered. For a journey of 10 km the charge paid is Rs.75 and for a journey of 15 km the charge paid is Rs.110. What will a person have to pay for travelling a distance of 25 km? **[2]**

24. Use elimination method to find all possible solutions of the following pair of linear equations: **[2]**

$2x + 3y = 8$ ...(1)

$4x + 6y = 7$ ...(2)

25. Find the value(s) of p in the pair of the equation: $3x - y - 5 = 0$ and $6x - 2y - p = 0$, if the lines represented by these equations are parallel. **[2]**

26. Show that $x = 2$, $y = 1$ is not a solution of the system of simultaneous linear equations **[2]**

$2x + 7y = 11$

$x - 3y = 5$

27. ABCD is a rectangle if the value of AB = 12 is given, find the values of x and y. **[2]**

28. A natural number, when increased by 12, equals 160 times its reciprocal. Find the number. **[2]**

29. If one root of the quadratic equation $x^2 + 12x - k = 0$ is thrice the other root, then find the value of k. **[2]**

30. Find the roots of the quadratic equation $6x^2 - x - 2 = 0$. **[2]**

31. Find the value of x for which $(8x + 4)$, $(6x - 2)$ and $(2x + 7)$ are in A.P. **[2]**

32. Which term of the sequence 114, 109, 104, ... is the first negative term? **[2]**

Section C

33. Find the zeroes of the polynomial $4x^2 + 5\sqrt{2}x - 3$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomial. **[3]**

34. Find the zeroes of quadratic polynomial $x^2 - 2x - 8$ and verify the relationship between the zeroes and their coefficients. **[3]**

35. Find the zeroes of the polynomial $v^2 + 4\sqrt{3}v - 15$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. **[3]**

36. Find a quadratic polynomial whose sum and product of the zeroes are $\frac{-3}{2\sqrt{5}}, -\frac{1}{2}$ respectively. Also find the zeroes of the polynomial by factorisation. **[3]**

37. Find the zeroes of the polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomial. **[3]**

38. Two years ago father was five times as old as his son. Two years later, his age will be 8 years more than three times the age of the son. Find the present ages of father and son. **[3]**

39. Find two numbers such that the sum of twice the first and thrice the second is 92, and four times the first exceeds seven times the second by 2. **[3]**

40. Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu? Solve the pair of the linear equation obtained by the elimination method. **[3]**

41. Solve the system of equations by using the method of substitution: **[3]**

    $x + 2y = -1$

    $2x - 3y = 12$

42. A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay Rs 3,000 as hostel charges whereas Mansi who takes food for 25 days pays Rs 3,500 as hostel charges. Find the fixed charges and the cost of food per day. **[3]**

43. Find three consecutive positive integers whose product is equal to sixteen times their sum. **[3]**

44. For what value of k, are the roots of the quadratic equation $kx(x - 2) + 6 = 0$ equal? **[3]**

45. At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Find the present ages of both Asha and Nisha. **[3]**

46. An aeroplane left 50 minutes later than its scheduled time, and in order to reach the destination, 1250 km away, in time, it had to increase its speed by 250 km/hr from its usual speed. Find its usual speed. **[3]**

47. Find the 20th term of an A.P. whose 3rd term is 7 and the seventh term exceeds three times the 3rd term by 2. Also, find its nth term (a_n). **[3]**

48. The sum of the first 30 terms of an A.P. is 1920. If the fourth term is 18, find its 11th term. **[3]**

49. If the sum of the first 14 terms of an A.P. is 1050 and its first term is 10 find its 20th term. **[3]**

Section D

Question No. 50 to 53 are based on the given text. Read the text carefully and answer the questions: **[4]**
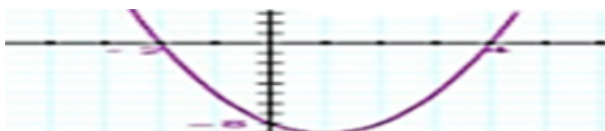
An asana is a body posture, originally and still a general term for a sitting meditation pose, and later extended in hatha yoga and modern yoga as exercise, to any type of pose or position, adding reclining, standing, inverted, twisting, and balancing poses. In the figure, one can observe that poses can be related to representation of quadratic polynomial.

50. Which type the shape of the poses shown in figure?

51. In the graph, how many zeroes are there for the polynomial?

52. Write two zeroes in the shown given graph?

53. How many zeroes are possible for a quadratic polynomial?

Question No. 54 to 57 are based on the given text. Read the text carefully and answer the questions: **[4]**

TOWER OF PISA : To prove that objects of different weights fall at the same rate, Galileo dropped two objects with different weights from the Leaning Tower of Pisa in Italy. The objects hit the ground at the same time. An object dropped off the top of Leaning Tower of Pisa falls vertically with constant acceleration. If s is the distance of the object above the ground (in feet) t seconds after its release, then s and t are related by an equation of the form $s = a + bt^2$ where a and b are constants. Suppose the object is 180 feet above the ground 1 second after its release and 132 feet

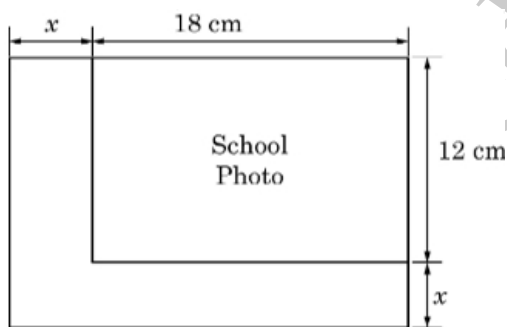above the ground 2 seconds after its release.

54. Find the constants a and b.

55. How high is the Leaning Tower of Pisa?

56. How long does the object fall?

57. At t = 2 sec, the object is at what height?

Question No. 58 to 61 are based on the given text. Read the text carefully and answer the questions: **[4]**

While designing the school year book, a teacher asked the student that the length and width of a particular photo is increased by x units each to double the area of the photo. The original photo is 18 cm long and 12 cm wide.

58. Write an algebraic equation depicting the above information.

59. Write the corresponding quadratic equation in standard form.

60. What should be the new dimensions of the enlarged photo?

61. Can any rational value of x make the new area equal to 220 cm^2?

Question No. 62 to 65 are based on the given text. Read the text carefully and answer the questions: **[4]**

Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of ₹ 1,18,000 by paying every month starting with the first instalment of ₹ 1000. If he increases the instalment by ₹ 100 every month , answer the following:

62. Find the amount paid by him in 30th installment.

63. Find the amount paid by him in 30 installments.

64. If total installments are 40 then amount paid in the last installment?

65. Find the 10th installment, if the 1st installment is of ₹ 2000.

Section E

66. If α and β are the zeroes of the polynomial $x^2 + 4x + 3$, find the polynomial whose zeroes are $1 + \frac{\beta}{\alpha}$ and $1 + \frac{\alpha}{\beta}$. . **[5]**

67. Find the zeros of $q(y) = 7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeros and its coefficients. **[5]**

68. Solve for x and y : **[5]**

    2x - y + 3 = 0

    3x - 5y + 1 = 0

69. It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for four hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. How long would it take for each pipe to fill the pool separately? **[5]**

70. Sum of the areas of two squares is 544 m^2. If the difference of their perimeters is 32 m, find the sides of the two squares. **[5]**

71. The perimeter of a rectangular field is 82 m and its area is 400 square metre. Find the length and breadth of the rectangle. **[5]**

72. The sum of two numbers is 34. If 3 is subtracted from one number and 2 is added to another, the product of these two numbers becomes 260. Find the numbers. **[5]**

73. How many terms of the AP $20, 19\frac{1}{3}, 18\frac{2}{3}, \ldots$ must be taken so that their sum is 300? Explain the double answer. **[5]**

74. Divya deposited ₹1000 at compound interest at the rate of 10% per annum. Find the amount at the end of first year, second year, third year,..., and so on. Does this situation make an arithmetic progression. If yes, why? **[5]**

75. Find the sum of all integers from 1 to 500 which are multiplies of 2 as well as of 5. **[5]**