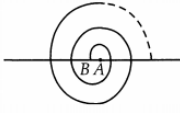# Applied Academy

H-76 Sec 22

AP AND PROBABILITY

Class 10 - Mathematics

1. Two APs have the same common difference. The first term of one of these is –1 and that of the other is – 8. Then the difference between their 4th terms is **[1]**

   a) - 1   b) - 9

   c) - 8   d) 7

2. The common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, ...$is **[1]**

   a) -1   b) $-\frac{1}{p}$

   c) 1   d) $\frac{1}{p}$

3. Which term of the A.P. -29, -26, -23, ..., 61 is 16? **[1]**

   a) 11th b) 31st

   c) 10th d) 16th

4. If the common difference of an AP is 5, then what is $a_{18} - a_{13}$ **[1]**

   a) 30   b) 25

   c) 20   d) 5

5. The sum of first five multiples of 3 is **[1]**

   a) 55   b) 65

   c) 50   d) 45

6. If p - 1, p + 1 and 2p + 3 are in A.P., then the value of p is **[1]**

   a) 0   b) 4

   c) 2   d) -2

7. The sum of the third and seventh terms of an A.P. is 6 and their product is 8. Find the sum of first sixteen terms of the A.P. **[1]**

   a) None of these   b) 86

   c) Both (86) and (90)   d) 90

8. The 13th term of an AP is 4 times its 3rd term. If its 5th term is 16 then the sum of its first ten terms is **[1]**

   a) 135   b) 175

   c) 150   d) 160

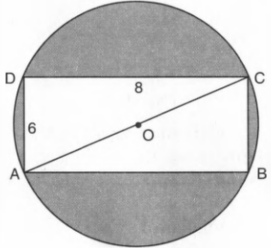9. In an A.P. it is given that a = 5, d = 3 and $a_n = 50$, then the value of n is **[1]**

   a) 16   b) 18

c) 20   d) 15

10. The common difference of the A.P. whose n^{th} term is given by $a_n = 3n + 7$, is: **[1]**

    a) 7   b) 3

    c) 1   d) 3n

11. Find the sum of the first 20 terms of the A.P.: $\frac{2}{3}, 0, -\frac{2}{3}, -\frac{4}{3}, \ldots\ldots$ **[1]**

12. Write the nth term of the A.P. $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, \ldots\ldots$ **[1]**

13. Is series $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \ldots\ldots$ an A.P.? Give reason. **[1]**

14. Find the value of x so that -6, x, 8 are in A.P. **[1]**

15. Find the nth term. Given a = first term = 3.5, d = common difference = 0, n = 105, a_n = the nth term = ? **[1]**

16. Find the sum of last ten terms of the A.P.: 8,10,12,14,.., 126. **[2]**

17. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed? **[2]**

18. Find the sum of the first 25 terms of an AP, whose n^{th} term is given by $a_n = 7 - 3n$. **[2]**

19. Find the number of terms of the A.P. **[2]**

293, 285, 277, ..., 53

20. If the 10th term of an A.P. is 52 and 17th term is 20 more than the 13th term, find the A.P. **[2]**

21. Find the sum of the AP $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \ldots\ldots$ upto 11 terms. **[2]**

22. Check whether 301 is a term of the given list of numbers: 5, 11, 17, 23,...? **[2]**

23. Find the sum of the A.P. -26, -24, -22,...to 36 terms. **[2]**

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

25. How many numbers lie between 10 and 300, which when divided by 4 leave a remainder 3? Also, find their sum. **[2]**

26. How many terms of the Arithmetic Progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer. **[3]**

27. Find the sum of all natural numbers between 100 and 500 which are divisible by 8. **[3]**

28. The sum of first three terms of an AP is 48. If the product of first and second terms exceeds 4 times the third term by 12. Find the AP. **[3]**

HINT Let these angles be x^o, (x + 10)^o, (x + 20)^o and (x + 30)^o. Their sum is 360°.

29. The amount of money in the account every year, when ₹ 10000 is deposited at compound interest at 8% per annum. Is this situation make an arithmetic progression and why? **[3]**

30. A spiral is made up of successive semi-circles with centres alternately at A and B starting with A, of radii 1 cm, 2 cm, 3 cm,.... as shown in the figure. What is the total length of spiral made up of eleven consecutive semi-circles? **[3]**

31. The 4th term of an AP is zero. Prove that its 25th term is triple its 11th term. **[3]**

32. If the last term of an A.P. of 30 terms is 119 and the 8th term from the end (towards the first term) is 91, then find the common difference of the A.P. Hence, find the sum of all the terms of the A.P. **[3]**

33. The sum of 5th and 9th terms of an A.P. is 72 and the sum of 7th and 12th terms is 97 .Find the A.P. **[3]**

34. If the mth term of an A.P. is $\frac{1}{n}$ and nth term be $\frac{1}{m}$, then show that its (mn)th term is 1. **[3]**

35. 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]**

36. Ramkali would need ₹1800 for admission fee and books etc., for her daughter to start going to school from next year. She saved ₹50 in the first month of this year and increased her monthly saving by ₹20. After a year, how much money will she save? Will she be able to fulfil her dream of sending her daughter to school? **[5]**

37. The sum of four consecutive numbers in A.P. is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7 : 15. Find the number. **[5]**

38. In an A.P., the sum of the first **n** terms is $3n^2 + n$. Find the first term and the common difference of the A.P. Hence, find its 15th term. **[5]**

39. A manufacturer of TV sets produced 720 TV sets in the fourth year and 880 TV sets in the eighth year. Assuming that the production increases uniformly by a fixed number every year, find the production in the tenth year and the total production in the first seven years. **[5]**

40. Let there be an A.P. with first term 'a', common difference 'd'. If a_n denotes its nth term and S_n the sum of first n terms, find n and a_n, if a = 2, d = 8 and $S_n = 90$. **[5]**

41. The ratio of the 11th term to 17th term of an A.P. is 3: 4. Find the ratio of 5th term to 21st term of the same A.P. Also, find the ratio of the sum of first 5 terms to that of first 21 terms. **[5]**

42. A man arranges to pay off a debt of ₹36000 by 40 monthly installments which form an arithmetic series. When 30 of the instalments are paid, he dies leaving one-third of the debt unpaid. Find the value of the first installment. **[5]**

43. The ratio of the sums of first m and first n terms of an AP is $m^2:n^2$. Show that the ratio of its mth and nth terms is (2m -1):(2n -1). **[5]**

44. **Assertion (A):** Arithmetic mean between 8 and 12 is 10. **[1]**
    Reason (R): Arithmetic mean between two numbers a and b is given as $\frac{a+b}{2}$.

    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.

45. **Assertion (A):** Sum of natural number from 1 to 100 is 5050. **[1]**
    Reason (R): Sum of n natural number is $\frac{n(n+1)}{2}$.

    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.

46. **Assertion (A):** The constant difference between any two terms of an AP is commonly known as common difference. **[1]**
    Reason (R): The common difference of 2, 4, 6, 8 this A.P. is 2.

    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.

47. Two coins are tossed together. The probability of getting at least one tail is: **[1]**

    a) $\frac{1}{4}$
    b) 1

c) $\frac{1}{2}$ d) $\frac{3}{4}$

48. Two dice are rolled simultaneously. The probability that they get different faces on both dices is ,   **[1]**

   a) $\frac{5}{6}$ b) $\frac{1}{6}$

   c) $\frac{1}{3}$ d) $\frac{2}{3}$

49. Two dice are thrown simultaneously. The probability that the product of the numbers appearing on the dice is 7   **[1]**
   is

   a) 7   b) 2

   c) 0   d) 1

50. A number is chosen from the numbers 1, 2, 3 and denoted as x, and a number is chosen from the numbers 1, 4, 9   **[1]**
   and denoted as y. Then $P(xy < 9)$ is:

   a) $\frac{7}{9}$ b) $\frac{5}{9}$

   c) $\frac{3}{9}$ d) $\frac{1}{9}$

51. A die is rolled once. The probability that a composite number comes up, is: **[1]**

   a) $\frac{2}{3}$ b) $\frac{1}{2}$

   c) 0   d) $\frac{1}{3}$

52. A black die and a white die are thrown at the same time. Write all the possible outcomes. What is the probability   **[1]**
   that the numbers obtained have a product less than 16?

53. One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the   **[1]**
   probability that the card drawn is a face card.

54. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.   **[1]**

55. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random, then find the probability that it   **[1]**
   bears a multiple of 15.

56. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. Find the probability that   **[1]**
   selected ticket has a number which is a multiple of 5.

57. The army purchased 1250 guns from an arms dealer. If in every lot of 50 guns, there are only 47 good ones, find   **[2]**
   the probability that from a lot of 50 guns, we get a defective gun. How many defective guns do you expect in the
   purchase of 1250 guns?

58. A carton consists of 100 shirts of which 88 are good and 8 have minor defects. Rohit, a trader, will only accept   **[2]**
   the shirts which are good. But, Kamal, an another trader, will only reject the shirts which have major defects.
   One shirt is drawn at random from the carton. What is the probability that it is acceptable to

   i. Rohit and

   ii. Kamal?

59. Cards each marked with one of the numbers 4, 5, 6, ..., 20 are placed in a box and mixed thoroughly. One card is   **[2]**
   drawn at random from the box. What is the probability of getting an even number?

60. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the   **[2]**
   probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black
   ball is now double of what it was before. Find x.

61. Two dice are thrown at the same time. Determine the probabiity that the difference of the numbers on the two   **[2]**
   dice is 2.

62. All the jacks, queens and kings are removed from a deck of 52 playing cards. The remaining cards are well **[3]** shuffled and then one card is drawn at random. Giving ace a value 1, similar value for other cards, find the probability that the card has a value

   i. 7

   ii. greater than 7

63. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of drawing: **[3]**

   i. an ace

   ii. '2' of spades

   iii. '10' of a black suit.

64. In Fig., a dart is thrown and lands in the interior of the circle. What is the probability that the dart will land in the **[3]** shaded region?

65. In a bag there are 44 identical cards with figure of circle or square on them. There are 24 circles, of which 9 are **[3]** blue and rest are green and 20 squares of which 11 are blue and rest are green. One card is drawn from the bag at random. Find the probability that it has the figure of

   i. square

   ii. green colour,

   iii. blue circle and

   iv. green square.

66. A square dart board is placed in the first quadrant from $x = 0$ to $x = 6$ and $y = 0$ to $y = 6$. A triangular region on **[3]** the dart board is enclosed by the lines $y = 2$, $x = 6$ and $y = x$. Find the probability that a dart that randomly hits the dart board will land in the triangular region formed by the three lines.

67. A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, find the **[5]** probability that it bears

   i. a two digit number,

   ii. number divisible by 5.

68. A bag contains 15 balls of which x are blue and the remaining are red. If the number of red balls are increased by **[5]** 5, the probability of drawing the red balls doubles. Find :

   i. P(red ball)

   ii. P(blue ball)

   iii. P(blue ball if of 5 extra red balls are actually added)

69. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting **[5]**

   i. a king of red suit

   ii. a face card

   iii. a red face card

   iv. a queen of black suit

    v. a jack of hearts

    vi. a spade.

70. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days? **[5]**

71. All the three face cards of spades are removed from a well-shuffled pack of 52 cards. A card is drawn at random from the remaining pack. Find the probability of getting **[5]**

    i. a black face card

    ii. a queen

    iii. a black card

    iv. a spade

72. **Assertion (A):** If a die is thrown, the probability of getting a number less than 3 and greater than 2 is zero. **[1]**
Reason (R): The probability of an impossible event is zero.

    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.

73. **Assertion (A):** In a simultaneous throw of a pair of dice. The probability of getting a double is $\frac{1}{6}$. **[1]**
Reason (R): The probability of an event may be negative.

    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.

74. **Assertion (A):** Tossing a coin 50 times is called an event. **[1]**
Reason (R): The possible outcomes of an experiment are called events.

    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.

75. **Assertion (A):** When two coins are tossed together, the probability of getting no tail is $\frac{1}{4}$. **[1]**
Reason (R): The probability P(E) of an event E satisfies $0 \leq P(E) \leq 1$.

    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.