INSIGHT @22

A Quick revision program for students appearing for SSLC exam 2022
(MATHEMATICS)
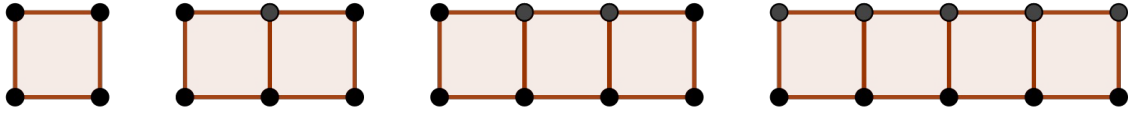**Part 1**

Master the concepts , to face the challenges

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ARITHMETIC SEQUENCES

1. Observe the figure. Lines of length 1cm are used to make series of rectangles.

    a) Write the sequence of squares in each figure.

    b)Write the sequence of Rectangles in each figure.

    c)Write the sequence of black dots in each figure.

    d)Write the sequence of total length of lines in each figure.

    e)Which of them are Arithmetic sequences?

2. a) Write the sequence of multiples of 7

    b) Write the sequence of numbers which give a remainder 1 when divided by 7

    c) Write the sequence of numbers which give a remainder 5 when divided by 7

    e) Write the common difference of the above sequences.

3. Consider the AS 4 , 7 , 10 , 13 ......

    a) Write the first term and common difference.

    b) Write its 33rd term.

    c) Write an AS with first term 4 and common difference -3.

    d) Write its 33rd term.

4. Write the missing terms of the following AS's.

    a)10 , 22 , -------- , --------

    b) ------- ,-------- , 10 , 22

    c)10 , -------- , 22

    d) 10 , ------- ,-------, 22

    e) -10 , -------- , ------- ,-------- , 22

5. The 17th and 25th terms of an AS are 100 , 140.

    a) Find the 21st term.

    b) How many times common difference are added with 17th term to get 25th term ?

    c) Find the 33rd term.

    d) Find the 9th term.

6. The 11th and 18th terms of an AS are 83 , 188.

    a) Find common difference

    b) Find first term

   c) Write the sequence.

7. Consider the sequence 4 , 10 , 16 . . .

   a)Write the common difference.

   b)Can the difference of any two terms of this sequence be 60 ?

   c)Is 200 a term of the sequence?

   d) Which term is 154 ?

8. Write the nth term (algebraic form) of the following AS's

   a) first term = 5 , common difference = 3

   b) first term = 5 , common difference = -3

   c) first term = 5 , common difference = $\frac{1}{3}$

9. a) Which of the following can be the nth term of an AS ? 3n-2 , $2n^2+3$

   b) Write the first term and common difference of the sequence.

   c) Write the following sequences whose nth term is as given below.

     i) 2n-1   ii) 4-3n   iii) $\frac{1}{3}$n -2   vi) 5n

10. Consider the AS with nth term 3n+2.

   a) Find 81st term (Hint: put n=81)

   b) which term is 122 ?

   c) show that 400 is not a term of it.

   d) which is the first 4 digit number in this sequence ?

11. Consider the AS 4 , 7 , 10 , 13 ......

   a) Find the square of 4th term. Is it a term of the same sequence ?

   b)Write the algebraic form of the sequence.

   c)using algebraic form show that the square of any terms of it is again in this sequence.

   d)Show that if x^2 is a term of any AS with common difference d , then $(x+d)^2$ is also a term.

12. a) Find the sum of first 18 natural numbers.

   b) Find the sum of first 10 odd numbers.

   c) Find the sum of first 15 even numbers.

   d) How many odd numbers from beginning are added to get a sum 324 ?

13. Find the Sums

   a) 1+2+3+4+5+ . . . . . .+15

   b) 2+4+6+8+10+ . . . . . +30

   c) 3+6+9+12+ . . . .+45

   d) 4+7+10+13+ . . . . . .+46

14. a) The 4th term of an AS is 50. What is the sum of first 7 terms ?

b) The 1st and 13th terms of an AS are 7 , 55. What is the sum of first 13   terms ?

c) What is the sum of first 25 terms of the sequence 1 , 5 , 9 , 13 , . .

d) Find the sum of first n terms of the above sequence 1 , 5 , 9 , 13 , . . ?

e) What is the sum of first 10 terms of the sequence with nth term 7n-4 ?

f) What is the sum of first n terms of the sequence with nth term 7n-4 ?

15. The sum of 12th and 18th terms of an AS is 298 ,

a)Find 15th term?

b)What is the sum of 1st and 29th terms?

c)What is the sum of first 29 terms?

16. Consider the sequence of numbers below 150 , which give a remainder 2 when divided by 5.

a) what are its first and last terms ?

b) How many terms are there in the sequence ?

c) What is their sum ?

17. Given the expression for sum of first n terms of various arithmetic sequences.

a) $3n^2 + n$, Find first term , common difference and sum of first 10 terms

b) $2n - n^2$, Find first term , common difference and algebraic form

18. a) The sum of first 11 terms of an AS is 110. Write the middle term.

b) Write an AS with 5 terms and sum 60

c) The sum of first 6 terms of an AS is 60. Find the sum of first and last terms of it.

d) Write an AS with 6 terms and sum 60

19. Consider the number pattern below.

1

2 3

4 5 6

7 8 9 10

....

....

a) Write next two lines

b) How many numbers are in the 4th line ?

c) What is the last number in 4th line ?

d) What is the first number in the 5th line ?

e) What will be the last number in 11th line ?

MATHEMATICS OF CHANCES

1. Consider first 100 natural numbers.
   a) How many of it are odd numbers ?
   b) What part of the whole is these odd numbers ?
   c) If one person is asked to select a number from these , what is the probability that it is odd ?

2. A box contains 15 balls , of which 6 are red , others being blue or green.
   Without looking in the box , one ball is taken.
   a) Find the probability that it is red.
   b) What is the probability that it is not red ?
   c) If the probability that it is blue is ⅓ , how many blue balls are there ?
   d) What is the probability that it is green ?

3. a)The probability of a man winning a game is 5/7, then what is that of losing it?
   b) Birthday of a person is in February 2022. What is the probability that it is on a sunday ?
   c) The letters of the word MALAYALAM are written in pieces of paper , and one slip is taken
      at random. What is the probability that it is A ?
   d) In a month having 30 days what is the probability that there are 5 Sundays ?

4. Two coins are tossed together.
   a)What are the possible outcomes ?
   b) Find the chance that both are Heads.
   c) Probability for at least one Tail appear.
   d) Chance for one Tail, One Head.

5. Using the digits 0,1,2,5 , various three digit numbers are made and are written in paper slips and
   put in a box. Without looking one slip is taken.
   a)How many slips will be there in the box ?
   b)Find the probability that the ball drawn is an even number.
   c)Find the probability that the product of digits is 0 ?
   d)Find the probability that the number is a multiple of 5?

6. One person is asked to tell a two digit number . Find the chance that the number he tells is
      a) of same digits
      b) having sum of digits 10
      c) a perfect square.
      d) Sum of the digits is even.

7. One box contain 5 pen and 6 pencil. Another box contain 5 pens and 7 pencils. Without looking
   one item is taken from each box.
      a) In how many different ways we can do it ? ?
      b) How many pairs are possible in which both are pens ?
      c) What is the chance for both being pens ?
      d) What is the chance for both being pencils ?
      e) What is the probability for getting a pen and pencil ?

8. Without looking , if a dot is put in each of the following figures , what is the chance that it falls
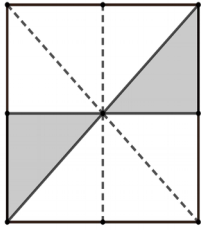   Inside the shaded region

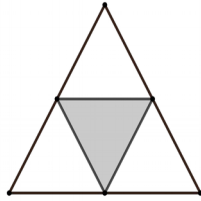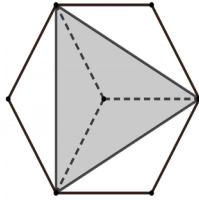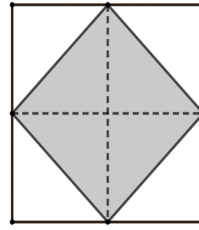| Fig 1 | Fig2 | Fig3 | Fig4 | Fig5 |

9. Without looking , A dot is put in the following figure.
   a) Find the area of shaded region (take radius of circle as r)
   b) Find the area of square.
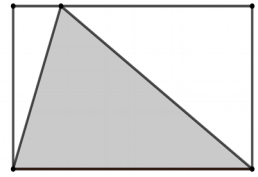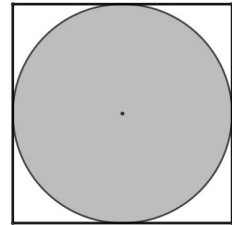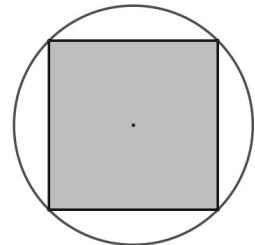   c) Find the probability that the dot falls Inside the shaded region.

10. Without looking , if a dot is put in the following figure.
    a) Find the area of shaded region (take radius of circle as r)
    b) Find the area of circle.
    c) Find the probability that the dot falls Inside the shaded region.

SECOND DEGREE EQUATIONS

1. a) The square of a number is 441. What are the numbers ?
   b) When the sides of a square was increased by 7 , its area became 444cm^2. Write as a second degree equation.
   c) Find the length of sides of the original square.

2. a) If x is a multiple of 8 , write the next multiple of 8.
   b) What should be added with x^2+8x to make it a perfect square ?
   c) The product of two consecutive multiples of 8 is 209 , Write an equation
   d) Find those numbers.

3. The common difference of an arithmetic sequence is -7.
   a) If the first term is taken as x , write the 4th term
   b) The product of first and fourth terms of this arithmetic sequence is 270. Write an equation
   c) Find the first term.

4. a) Is there any natural number which is equal to $\sqrt{-4}$?
   b) For what value of x we get $x^2 – 12x = -35$?
   c) Show that there doesn't exist a natural number x such that $x^2 – 12x = -37$.

5. a) What is the value of the coefficients a,b,c in the equation $2x^2+7x-4 = 0$?
   b) Find the value of x for which $2x^2+7x-4 = 0$.
   c) Show that $3x^2 -10x+45 = 0$ doesn't have a solution.

6. a) What is the sum $1+2+3+5+6+ . . . . . . + 35$?
   b) How many natural numbers from beginning is to be added to get a sum 703 ?
   c) Is it possible that sum of first n even numbers give a sum 1000 ?

7. The sum of two numbers is 22. Their product is 117.
   a) If one of the number is taken as x , what is the other number ?
   b) Write an equation connecting the numbers and area.
   c) Find those numbers.

8. The Area and perimeter of a rectangle are 28cm^2 and 22cm.
   a) If length is taken as x, write breadth in terms of x.
   b) Write an equation connecting the sides and area.
   c) Find length and breadth.

9. a) Show that it is not possible to have two numbers with sum 12 and product 37.
   b) Show that it is not possible to have a rectangle with perimeter 24 and area 37cm^2.

10. Find the solutions of following equations , if possible.
   a) $(x-4)^2 = 576$
   b) $x^2 -11x = 126$
   c) $x^2-4x+2 = 0$
   d) $x^2-4x+5 = 0$

POLYNOMIALS

1. Consider the polynomial p(x) = x^2-7x-8. Find the following values.
   P(1) ,p(-1) , p(8) , p(-8) , p(0)

2. Consider the polynomial p(x) = (x+1)(x-2)
   a) What are the two first degree factors of p(x) ?
   b) Find p(-1) and p(2). What you see ?
   c) If x+2 is a factor of a polynomial q(x) , What is q(-2) ?
   d) R(x) is a polynomial such that R(3)=0 , then write one factor of R(x).

3. P(x) is a third degree polynomial such that p(2)=0, p(-3)=0 , p(0)=0.
   a) write the three factors of p(x)
   b) write the polynomial p(x)
   c) Find p(1)

4. p(x) = $4x^2$+x-3
   a) Find p(1) , Is x-1 a factor of p(x) ?
   b) show that x+1 is a factor.
   c) Write the other factor.
   d) x-3 is a factor of $2x^2$-7x+3 , Write the other factor.

5. The solutions of a second degree equation p(x)=0 are -1 , 7.
   a) Find p(-1) and p(7)
   b) What are the factors of p(x) ?
    c) Write p(x)

6. Given , x-2 is a factor of the polynomial x^3-7x+ k .
   a) Find the value of k.
   b) Is x-1 a factor of it ?
   c) Find the third factor.
7. If p(x) = x^3+ax^2 -10x+b. Given , x+1 and x-4 are factors of p(x)
    a) write 2 equations containing a and b
    b) Find the value of a and b.
    c) Write the third factor.
8. a) Find the product (x+7)(x-3)
    b) x^2+8x-105 = (x+15)(x+a). Find a
    c) x^2+11x+28 = (x+a)(x+b). Find a,b

9. Write the following polynomials p(x) as a product of first degree polynomials.
   Hence find solution of the each of the equations p(x)=0
    a) x^2+13x+40
    b) x^2 -13x+40
    c) x^2+3x-40
    d) x^2-3x-40
10. Write the solutions of the following equations p(x)=0. Hence factorise each of the the
polynomials p(x).
    a) x^2+3x-40 =0
    b) x^2-6x-40 = 0
    c) x^2-6x-7 = 0
    d) $2x^2$-5x-3=0
    e) show that x^2+3x+4=0 can't be factorised into first degree polynomials.

STATISTICS

1) The marks obtained by a student in 10 subjects are given below.

   93 , 92 , 95 , 93 , 94 , 96 , 95 , 94 , 95 , 50

   a) Find mean mark

   b) Find median mark

   c) Which is more realistic ? Why ?

2. a) Find the mean and median of first 11 natural numbers.

   b) show that mean and median of any set of 11 consecutive terms of an AS are equal.

3. a) The average of 11 numbers are 13 , If one more number is considered , the average became 12What is that number ?

   b) The mean of first 5 numbers is 7 , mean of next five numbers is 8. What is the mean of first 10 numbers ?

4) Consider the table giving the marks obtained by 25 students in a class after an exam.

mark	3	4	5	6	7	8	9	10
Students	2	3	4	4	6	3	2	1

   a)How many students have their marks below 5 ?

   b) If the marks are arranged in ascending order , find the mark of student at 10th position ?

   c) Which student's mark will be considered as median mark ?

   d) Find median mark for the class.

5)Consider the table giving the ages of 25 people in a sports club

Age	1-10	10-20	20-30	30-40	40-50
No: of pupil	5	7	10	8	3

   a)How many pupil have their age below 30?

   b) If they are arranged according to age Which person will be at the middle ?

   c)What is the age group of that person ?

   d) Assuming that the ages of pupil in this age group are in arithmetic sequence , what will be the age of 13th person ?

   e) Whose age is considered as median age ?

   f)Find median age.

6)Find median wage from folowing table.

Daily wage	500 - 600	600-700	700-800	800-900	900-1000
No: workers	320	350	400	350	322

   a)How many pupil have their wage below 700?

   b)If they are arranged according to wage which person will be at the middle ?

   c)What is the wage group of that person ?

   d) Assuming that the wages of workers in this age group are in arithmetic sequence , what will be the wage of 671th person ?

   e) Whose wage is considered as median age ?

   f)Find median wage.