

Worksheet 12

- 1) Complete the addition :
 - a) Calculate the sum of counting numbers from 1 to 10
 - b) Calculate the sum of counting numbers from 1 to 100
 - c) Calculate the sum of the 48 terms of the sequence 3, 4, 5 \dots obtained by adding 1 repeatedly
 - d) Calculate the sum of counting numbers from 10 to 20
- 2) If $a' = a + 1, a = a - 1$
 - a) Find $1' - '1$
 - b) Find $2' - '2$
 - c) Find $(1' - '1) + (2' - '2) + (3' - '3) + \dots + (100' - '100)$
 - d) Find $1' + 2' + 3' \dots 100'$
- 3) The sum of first n counting numbers is $(n + 1) \times \frac{n}{2}$. Use this to complete the following calculations
 - a) Consider the sequence of the multiples of 3
3, 6, 9 \dots . Which is the largest two digit term of this sequence
 - b) Calculate the sum of all terms of this sequence below 100
 - c) Find the sum of all even numbers below 100
 - d) Calculate the sum of all multiples of 7 below 100
- 4) Consider the sequence 1, 2, 3, 4 \dots
 - a) Make pairs as (1, 2), (3, 4), (5, 6) \dots , find the sum of numbers in each pair and write the sums as a sequence
 - b) Is this an arithmetic sequence? why?
 - c) Write the algebraic form of this sequence
 - d) What is the common difference of the sequence obtained by adding three numbers in the group
 - e) What is the difference between the sum of the first n natural numbers and sum of next n natural numbers.
- 5) Nasrin has drawn a circle in her note book and marked 11 fine dots on the circle. She joined first dot to all other 10 dots to make chords.
 - a) How many chords can be drawn by joining second dot to the remaining dots in the same circle.
 - b) How many chords can be drawn using the third dot?
 - c) How many chords can be drawn using the fourth dot?
 - d) Find the total number of chords that can be drawn in this circle joining all 11 dots.

Answers and Explanation

- 1)
 - a) $\text{Sum} = (n + 1) \times \frac{n}{2} = (10 + 1) \times \frac{10}{2} = 55$
 - b) $\text{Sum} = (100 + 1) \times \frac{100}{2} = 5050$
 - c) $\text{Sum} = (1 + 2 + 3 + 4 \dots 50) - (1 + 2) = (50 + 1) \times \frac{50}{2} - 3 = 1272$
 - d) $\text{Sum of the terms from 10th term to 20th term} = \text{Sum from 1st term to 20th term} - \text{sum from 1st to 9th term}$
 $= (20 + 1) \times \frac{20}{2} - (9 + 1) \times \frac{9}{2} = 165$
- 2)
 - a) $1' - '1 = (1 + 1) - (1 - 1) = 2$
 - b) $2' - '2 = (2 + 1) - (2 - 1) = 2$
 - c) $2 \times 100 = 200$

- d) $1' + 2' + 3' \dots 100' = 2 + 3 + 4 + \dots + 101 = 1 + 2 + 3 + \dots + 100 + 100 = 5150 .$
- 3) a) 99
 b) $3 + 6 + 9 + \dots + 99 = 3(1 + 2 + 3 + \dots + 33) = 3 \times (33 + 1) \times \frac{33}{2} = 1683$
 c) $2 + 4 + 6 + \dots + 98 = 2(1 + 2 + 3 + \dots + 49) = 2 \times (49 + 1) \times \frac{49}{2} = 2450$
 d) $7 + 14 + 21 + \dots + 98 = 7(1 + 2 + 3 \dots + 14) = 7 \times (14 + 1) \times \frac{14}{2} = 735$
- 4) a) 3, 7, 11 ...
 b) Common difference 4. This is an arithmetic sequence
 c) $x_n = dn + (f - d) = 4n - 1$
 d) $3^2 = 9$
 e) n^2
- 5) a) 9
 b) 8
 c) 7
 d) $1 + 2 + 3 + \dots + 10 = 55$