WORKSHEET

Arithmetic series assignment

PART A (10 marks)

1 A sequence is given by 2, 5, 8, 11, … What are the next five terms?

2 Find t_{30} for the sequence 3, 6, 9, 12, 15, …

3 Calculate the common difference of the sequence 6, −1, −8, −15, …

4 Write the first 3 terms of the sequence $t_1 = 7$, $t_{n+1} = 2t_n - 1$.

5 Evaluate $2 + 4 + 6 + 8 + 10 + 12 + 14$.

6 Is the sequence $1 - x$, $x - 1$, $3x - 3$, $5x - 5$, … an arithmetic sequence?

7 Find the general term for the sequence $t_1 = 2$, $t_{n+1} = \dfrac{2t_n + 3}{2}$.

8 Write the first five terms of the Fibonacci series.

9 Find the sum of the first 5 terms of 6, 10, 14, …

10 How many terms are in the arithmetic progression 25, 14, 3, …, –41?

PART B (20 marks)

11 Amy saves $150 a week. She currently has $1650 saved. How much money will Amy have in her savings account in six weeks?

12 Which term is equal to 105 in the sequence –15, 0, 15, 30, …?

13 The 6th term of an arithmetic sequence is 50 and the 10th term is 64. What is the 15th term?

14 The sum of t_5 and t_{10} of a sequence is 10, which is also equal to t_{16}. What is t_{33}?

15 Determine how many terms it takes for the series 2, 4, 6, 8, … to first exceed 200.

16 The 5th term of an arithmetic sequence is 25 and the sum to 10 terms is 150. What is the first term in the sequence?

17 What is the general term for all positive even numbers?

18 Evaluate $-40 - 36 - 32 + \ldots$ to 20 terms.

19 How many terms of the series $5 + 8 + 11 + \ldots$ need to be added together to equal 549?

20 Find a formula for the sum of the first $n + 1$ terms of 3, 5, 7, …

CHALLENGE (bonus 3 marks)

A car decreases in value by the same dollar value every year. In 2017, the car cost $82 000, but in 2027, the car will only be worth $49 000. In what year will the car be worth less than 20% of its original value?

Answers

1 14, 17, 20, 23, 26
2 $t_{30} = 90$
3 $d = -7$
4 7, 13, 25
5 56
6 Yes. $d = 2x - 2$
7 $t_1 = 2,\ t_n = \frac{3n}{2} + \frac{1}{2}$
8 1, 1, 2, 3, 5
9 70
10 7
11 $2550
12 t_9
13 $t_{15} = 81.5$
14 $t_{33} = 20$
15 $n = 14$ terms
16 a = 105
17 $t_1 = 2,\ t_n = 2$n
18 $S_{20} = -40$
19 18
20 $n^2 + 4n + 3$

Challenge

In the 20th year.