

Resource for Day 5 – Sequences and Series – Wednesday 25 October

1. Give the next three terms in each of the following sequences:
 - a. $14a + 3 ; 11a + 8 ; 8a + 13 ; 5a + 18 ; \dots$ (2)
 - b. $2\,000y^2 ; -1\,000y^3 ; 500y^4 ; \dots$ (2)
 - c. $2 ; 5 ; 10 ; 17 ; \dots$ (2)
2. Is -21 a term in the sequence $19 ; 17\frac{1}{2} ; 16 ; 14\frac{1}{2} ; \dots$? (3)
3. A geometric sequence has $T_8 = 2\,025$ and $T_{12} = 400$. Find two possible value(s) for r (4)
4. An arithmetic sequence has $T_9 = 28$ and $S_{20} = 650$. Find the first three terms. (6)
5. Determine g if $g + 3 ; 4g + 2 ; 5g + 10$ are consecutive terms of a geometric sequence and $g \in \mathbb{Z}$. (5)
6. A **SIMI** sequence is one in which the terms in odd-numbered positions form an **arithmetic sequence** while the terms in even-numbered positions form a **geometric sequence**.

Consider this **SIMI** sequence: $2 ; \frac{1}{4} ; 5 ; \frac{1}{2} ; 8 ; 1 ; 11 ; 2 ; 14 ; \dots$

- a. write down the next two terms of the above **SIMI** sequence. (1)
 - b. find T_{21} of the above **SIMI** sequence. (3)
 - c. Find S_{19} of the above **SIMI** sequence. (6)
7. Determine p if $\sum_{i=7}^{30} (pi - 1) = 1\,308$ (5)
 8. A plant grows 90 cm in the first year. Each year thereafter it grows by 15% of the amount it grew the year before. What is the greatest height it can ever (never 😊) reach? (5)
 9. How many hexagons in figure n ? (5)



fig. 1

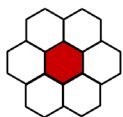


fig. 2

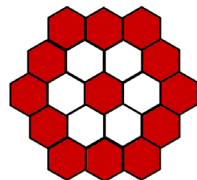


fig. 3

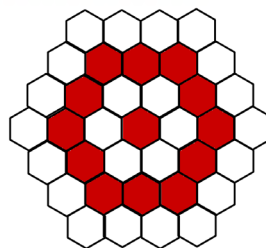
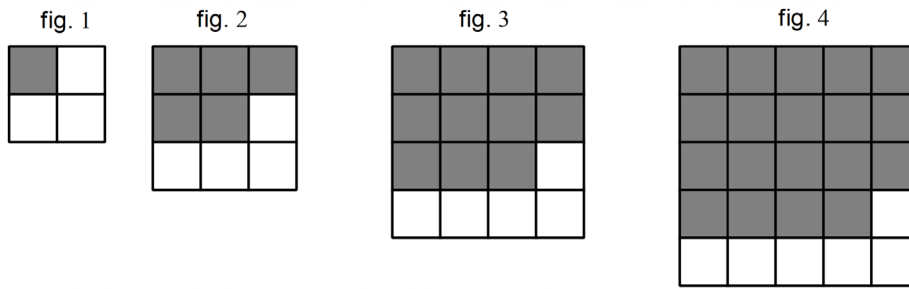


fig. 4

10. Which figure will have 599 shaded squares? (6)



11. The **first differences** of a quadratic sequence are given by $T_n = 1 - 2n$. If the third term of the quadratic sequence is 5 then find a formula for T_n , its n^{th} term. (6)

12. A quadratic sequence has a constant second difference of 2 and $T_5 = 39$ and $T_{10} = 124$. Find a formula for T_n , its n^{th} term. (6)

13. For which values of x will the series $\sum_{i=1}^{\infty} (-2x + 3)^i$ converge? (4)

14. The sum of 20 terms of an arithmetic series is 595 and $T_{n+2} - T_n = 5$ for all $n \in \mathbb{N}$. Find the first three terms. (5)