Name: _____ Date: _____ IB Math A&A SL

Lesson 4.0 – Intro to Number Sequences

I.   **What is a sequence?**

Consider the values of the first 5 terms of 3 sequences:

    A. 30, 40, 50, 60, 70, …

    B. 0, 5, 15, 30, 50, …

    C. 1, 2, 4, 8, 16, …

1. For each sequence, describe a way to produce a new term from the previous term.
2. If the patterns described continue, which sequence has the greatest value for the 10th term?

II.   **Practice with Sequences**

Work with a partner and try to guess the next three terms in each sequence.

    1. 1, -3, 9, -27, 81, …

    2. 9, 109, 209, 309, 409, …

    3. 0, 3, 8, 15, 24, …

    4. $\dfrac{1}{2}, \dfrac{1}{2}, \dfrac{3}{8}, \dfrac{1}{4}, \dfrac{5}{32}, \ldots$

    5. 4, 16, 36, 64, 100

Work with a partner and find the tenth term in each sequence.

    6. 7, 9, 12, 16, 21, …

    7. -4, 12, -36, 108, -324, …

    8. $-1, \dfrac{2}{3}, \dfrac{7}{3}, 4, \dfrac{17}{3}$

III. Sequences as Functions

Find the first four terms in each sequence.

9. $a(n) = n^2 + 1$

13. $u(n) = 3^{n-1}$

10. $a_n = \frac{2n+1}{n^3}$

14. $u_n = \frac{n^3}{2n+1}$

Find the tenth term in each sequence.

11. $a_n = \frac{2n+1}{n^3}$

15. $a(n) = 4^{n-1}$

12. $u(n) = (2n)^2$

16. $u_n = (2n-1)^2$

Write an explicit function/formula to model each sequence.

17. -12, -9, -6, -3, 0, …

18. -6, -3, -2, -3/2, -6/5, …

IV. Recursively-defined Sequences

Find the first four terms in each sequence.

19. $a_n = a_{n-1} + 10, a_1 = 29$

20. $u_n = u_{n-1} \cdot 2$

21. $u(n) = u(n-1) + n$

22. $a(n) = \frac{2 + a_{n-1}}{2}$

Write a recursive formula for each sequence.

23. 2, 4, 7, 11, 16, …

24. 15, 215, 415, 615, 815, …