



## Lesson 2

# Working with Arithmetic & Geometric Sequences

### (A) Lesson Objectives

- a. Introduce the general term for an arithmetic & geometric sequence
- b. Understand the connection between the general term and linear/exponential equations
- c. Develop proficiency with the skills & concepts associated with sequences

### (B) Opening Exercise

- a. Given the sequence 8,12,16,20,24,....., develop a formula that you can use to predict the 407<sup>th</sup> term
- b. EXPLAIN your prediction/formula
- c. Given the sequence 3,6,12,24,48,....., develop a formula that you can use to predict the 41<sup>st</sup> term
- d. EXPLAIN your prediction/formula

### (C) Formulas Associated with Arithmetic Sequences

- a. An example of an arithmetic sequence is →
- b. The formula associated with an arithmetic sequence is → \_\_\_\_\_, where .....
- c. The formula associated with linear relations is → \_\_\_\_\_ → so the similarities are ....

### (D) Formula Associated with Geometric Sequences

- a. An example of a geometric sequence is →
- b. The formula associated with a geometric sequence is → \_\_\_\_\_, where .....
- c. The formula associated with exponential relations is → \_\_\_\_\_ → so the similarities are ....

## Lesson 2

### (E) Examples

## Working with Arithmetic & Geometric Sequences

ex 1. Given the sequence 1, 5, 25, 125, 625.... find the next four terms

ex 2. Given the sequence 125, 115, 105, 95.... find the next four terms

ex 3. Given a formula, find the first 5 terms

(i)  $u_n = 3n - 2$

(ii)  $u_n = n^2 - 1$

(iii)  $u_n = (n-2)/(n+2)$

(iv)  $u_n = 5^{n-1}$

ex 4. Find the formula for the  $n$ th term (or the general term), then list the next three terms:

(i) 5,10,15,20 ... (ii) 2,3,4,5,... (iii) 1,4,9,16,... (iv) 2,4,6,8,... (v) -3,-6,-12,-24... (vi)  $1/2, 2/3, 3/4, 4/5, \dots$

ex 5. Write the first 6 terms of the sequence defined by  $u_n = -4 + (n-2)3$ . Find  $a$  and  $d$

ex 6. Given the formula for the  $n$ th term as  $u_n = 8 - 2n$ , find 10<sup>th</sup> term.

ex 7. Find the formula for the  $n$ th term given the arithmetic sequence 2,6,10,14,..... Then find the 17<sup>th</sup> term.

ex 8. How many terms are there in the arithmetic sequence 384, 380, 376, .....28, 24?

ex 9. If the 5<sup>th</sup> term of a sequence is  $\frac{3}{4}$  and the 14<sup>th</sup> term is 3, find  $a$ ,  $d$ , and  $u_n$  and the first three terms of the sequence.

ex 10. Write the first 6 terms of the sequence defined by  $u_n = 5(-2)^{n-1}$

ex 11. Given the formula for the  $n$ th term as  $u_n = -5(4)^{n-1}$ , find 10<sup>th</sup> term.

ex 12. Find the formula for the  $n$ th term given the geometric sequence 2,6,18,..... Then find the 7<sup>th</sup> term.

ex 13. How many terms are there in the geometric sequence 3,6,12,.....,384

ex 14. If the 5<sup>th</sup> term of a sequence is 1875 and the 7<sup>th</sup> term is 46,875, find  $a$ ,  $r$ , and  $u_n$  and the first three

### (F) Video Links for Extra Help

Arithmetic Sequences:	Geometric Sequences
<ol style="list-style-type: none"> <li><a href="http://www.youtube.com/watch?v=lj_X9JVSF8k">http://www.youtube.com/watch?v=lj_X9JVSF8k</a></li> <li><a href="http://www.onlinemathlearning.com/arithmetic-sequences-nth-term.html">http://www.onlinemathlearning.com/arithmetic-sequences-nth-term.html</a></li> </ol>	<ol style="list-style-type: none"> <li><a href="http://www.onlinemathlearning.com/geometric-sequences.html">http://www.onlinemathlearning.com/geometric-sequences.html</a></li> <li><a href="http://www.onlinemathlearning.com/geometric-sequences-nth-term.html">http://www.onlinemathlearning.com/geometric-sequences-nth-term.html</a></li> <li><a href="http://www.youtube.com/watch?v=C7tE26CDI2M&amp;feature=channel">http://www.youtube.com/watch?v=C7tE26CDI2M&amp;feature=channel</a></li> </ol>

### (G) Homework