**Unit 1- Sequences and Series\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lesson 1.1: Arithmetic Sequences**

Specific Outcome: 1. Analyze arithmetic sequences and series to solve problems.

**Introduction:**

You will work in groups and create categories, as many as possible, to categorize the sequences. We will have each group explain their rationale

Examples:

1)The most famous sequence Fibonacci: 1, 1, 2, 3, 5, 8, 13, 21, … \_\_\_\_\_\_\_\_\_\_

2)A recent cougar basketball game had the following sequence of points during the first 3 minutes of the game: 0, 2, 4, 6, 8, 10, 12, 14 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) A certain type of virus doubles every twenty of minutes. The following sequence illustrates the number of virus present in the first 100 minutes. 20, 40, 80, 160, 320 \_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) An object, released from the top of a building, has the following velocities, in m/s, during the first 4 seconds: 0, 9.81, 19.62, 29.43 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5)Maddy’s mother recorder her height, in cm, for her first 6 birthdays: 80, 90, 105, 110, 116, 124 \_\_\_\_\_\_\_\_\_\_\_\_

6)Leo, who loves to cause havoc on road trips, loudly counted the first 200 multiples of 7: 7, 14, 21, …, 1400 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) The radiation level of radioactive Caesium-137 at the site of Chernobyl has a half-life of 30 years. The following data can be created for a 384 g sample over a span of 150 years:

 384g, 192g, 96g, 48g, 24g \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) Lucie, who is saving up for a brand new car, received a birthday present of $2 500 from her parents which she invested at an annual rate of 5%. The following amounts were her yearly bank balance for the past 3 years. $2 500, $2 625, $2 756.25 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Definitions

**Arithmetic Sequence**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Common difference: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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* d=
* The difference may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**General Term: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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* Symbol is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example One

The Black Knight Inn is looking to hire a new maid service. A local maid service charges $35 for the first room and $22 for each additional room.

1. The Black Knight Inn has 150 rooms, determine the cost of hiring this maid service.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Terms | t1 | t2 | t3 | t4 | t150 |
| Sequence | $35 | $57 |  |  |  |
| Illustrating answer using 35 and 22. | 35 | 35 + 1(22) |  |  |  |
| Express sequence using the first room as, t1, and the increase as *d*. | t1 |  |  |  |  |

**The general term of an arithmetic sequence is :**

**Where:  is**

 ***n*  is**

 ***d* is**

 **is**

1. Create a general formula the maid service could use for a hotel of any size.
2. Another hotel in Red Deer was quoted $2 015 by the maid service to clean their hotel. Determine the number of rooms in this hotel.
3. A different maid service, which charges $32 for the first room, quoted the Black Knight Inn a price of $2 714. Determine the price this maid service charges for each additional room.

Example 2

Hailey’s comet comes around every 76 years, and was recorded first in 1531.

1. Are you going to see Hailey’s comet in your life time? Explain.
2. Determine the year Hailey’s comet will be seen for the 20th time.
3. Scientists are trying to predict future sightings of the comet. Will the comet be seen in 4500? Explain.
4. The Finlay comet was seen in 2009, and will be seen in 2037 with three **additional** sightings between those two years. Determine the three years the comet will be seen between 2009 and 2037.
5. Determine a simplified general equation for both comets.

**Assignment:** Pg. 16 questions 1, 2 , 3b, 4a, 5a,d, 6a, 10, 14, 16, 19, 22 Challenge 11, 12