9th Grade Math

Chapter 9 Notes

Arithmetic and Geometric Sequences

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chapter 9 ALEKS is due on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are \_\_\_\_ topics total, so I need to

 do \_\_\_\_\_ topics every school day!

**LESSON 9.1 BELLWORK**

**\*Growing Dots\***



1. Describe the pattern you see in the sequence of figures above.

2. Assuming the same pattern continues, how many dots will there be at 3 minutes?

3. How many dots will there be at 100 minutes?

4. Use what you have found to make a table, write an equation and graph the sequence.





 Equation:

**Lesson 9.1 –Arithmetic Sequences**

**Goal: I can recognize and write explicit and recursive formulas for arithmetic sequences.**

|  |  |  |
| --- | --- | --- |
| **Word** | **Definition** | **Picture or Example** |
| **Sequence** | A set of numbers, called terms, arranged in a particular order. | 7, 12, 17, 22, …1st term = 72nd term = 123rd term = 174th term = 22 |
| **Arithmetic Sequence** | A sequence that has an **addition** pattern. The difference between each term in the sequence is the same.The graph will be **linear**.**7, 12, 17, 22**  | TA: C:\cur_proj\Word Files\Arts\PNGs\HSAlg1_t_0406_011.pngArithmetic Sequence: |
| **Common Difference** | The number being added to each term in a sequence. |
| **Arithmetic****Explicit** **Formula** | The equation that can be used to find any term in a sequence.The equation is in slope-intercept form once it is simplified. The slope is the common difference and the y-intercept is *a* 0. |  |
| **Arithmetic Recursive****Formula** | The recursive rule gives the first number in a sequence, and the common difference. The recursive rule will not find any number in a sequence, unless you know the term before the one you are looking for. |   |

 Write the next three terms in the arithmetic sequence.

1. 1, 8, 15, 22, … 2. 20, 14, 8, 2, … 3. 12, 21, 30, 39, …

 4. 5, 3, 1, -1, … 5. First term: -2 6. First term: 36

 Common Difference:8 Common Difference: -5

Find the common difference of the arithmetic sequence.

 7. 42, 36, 30, 24, … 8. 15, 26, 37, 48, … 9. 15, 4, -7, -18, …

Make a table and then graph the arithmetic sequence.

 10. 1, 3, 5, 7, ... 11. 

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

 12. 16, 12, 8, 4, ... 13. 2, 3.5, 5, 6.5, ...

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

Determine whether the graph represents an arithmetic sequence. Explain.

 14. 15. 16.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Pattern** | **Common Difference** | **Explicit Formula** | $$a\_{10}$$ | **Recursive Formula** |
| **17.** | 9, 17, 25, 33, ... |  |  |  |  |
| **18.** | 31, 24, 17, 10, ... |  |  |  |  |
| **19.** |  |  |  |  | $a\_{1}=17$ $$a\_{n}=a\_{n-1}+2$$ |
| **20.** |  |  |  |  | $a\_{1}=82$ $$a\_{n}=a\_{n-1}-6$$ |
| **21.** |  |  | $$a\_{n}=7n+1$$ |  |  |
| **22.** |  |  | $$a\_{n}=-4n+63$$ |  |  |

23. In an auditorium, the first row of seats has 30 seats. Each row behind the first row has 4 more seats than the row in front of it. How many seats are in the 25th row?

**Arithmetic Sequences Day 2 Bellwork**

**Fill in the table.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Sequence** | **Common Difference** | **Explicit Formula** | $$a\_{12}$$ | **Recursive Formula** |
| **1.** | 12, 6, 0, -6, ... |  |  |  |  |
| **2.** | 22, 24, 26, 28, ... |  |  |  |  |
| **3.** |  |  | $$a\_{n}=-4n+17$$ |  |  |
| **4.** |  |  | $$a\_{n}=5n+1$$ |  |  |
| **5.** |  |  |  |  | $a\_{1}=-8$ $$a\_{n}=a\_{n-1}+9$$ |
| **6.** |  |  |  |  | $a\_{1}=40$ $$a\_{n}=a\_{n-1}-3$$ |

**LESSON 9.2 BELLWORK**

**\*More Growing Dots\***



1. Describe the pattern you see in the sequence of figures above. Is it arithmetic?

2. Assuming the same pattern continues, how many dots will there be at 5 minutes?



3. Fill in the table and write an equation for the sequence.

 (Hint: it’s not linear, it’s exponential.)

4. Use your equation to predict how many dots there will be after 10 minutes.

**Lesson 9.2 –Geometric Sequences**

**Goal: I can recognize and write explicit and recursive formulas for geometric sequences.**

|  |  |  |
| --- | --- | --- |
| **Word** | **Definition** | **Picture or Example** |
| **Geometric Sequence** | A sequence that has a **multiplication** pattern. The common ratio between each term in the sequence is the same.The graph will be **exponential**. | Geometric Sequence: |
| **Common Ratio** | The number being multiplied to each term in a sequence. |
| **Geometric****Explicit** **Formula** | The equation that can be used to find any term in a sequence.This equation will be in the form of an exponential function. | $$a\_{n}=1(5)^{n-1}$$ |
| **Geometric Recursive****Formula** | The recursive rule gives the first number in a sequence, and the common ratio. The recursive rule will not find any term in a sequence, unless you know the term before the one you are looking for. |   |

Determine whether the sequence is *arithmetic*, *geometric*, or *neither*. Explain your reasoning.

 1.  2.  3. 

 4.  5.  6. 

Write the next three terms of the geometric sequence.

 7.  8.  9. 

Write an equation for the *n*th term of the geometric sequence. Then find *a*6.

 10.  11.  12. 

 13. 14.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***n*** | 1 | 2 | 3 | 4 |
| ***an*** | 11 | 44 | 176 | 704 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***n*** | 1 | 2 | 3 | 4 |
| ***an*** | 2916 | 972 | 324 | 108 |



 15. 16.

Make a table, write the explicit and recursive rule, and then graph the geometric sequence.

 17. 6, 18, 54, 162, ...

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

18. 4, 2, 1, 0.5, ...

|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |



**19.** 2, 4, 8, 16, ...



|  |  |
| --- | --- |
| **Position, n** | **Term,** $a\_{n}$ |
|  |  |

**Fill in the table.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Sequence** | **Common Ratio** | **Explicit Formula** | $$a\_{7}$$ | **Recursive Formula** |
| **20.** | 10, 20, 40, 80, ... |  |  |  |  |
| **21.** | 108, 36, 12, 4, ... |  |  |  |  |
| **22.** |  |  | $$a\_{n}=-64\left(\frac{1}{2}\right)^{n-1}$$ |  |  |
| **23.** |  |  | $$a\_{n}=4\left(3\right)^{n-1}$$ |  |  |
| **24.** |  |  |  |  | $a\_{1}=6$ $$a\_{n}=2∙a\_{n-1}$$ |
| **25.** |  |  |  |  | $$a\_{1}=\frac{1}{4}$$$$a\_{n}=8∙a\_{n-1}$$ |

**Geometric Sequences Day 2 Bellwork**

**Write the explicit and recursive equation for each graph.**



1. **2.**

Write an explicit rule for the recursive rule. Then find *a* 9.

 3.  4.  5. 

Write a recursive rule for the explicit equation.

 6.  7.  8. 

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**9.**

**Unit 9**

**Arithmetic and Geometric Sequences**

|  |
| --- |
| **I can:**I can recognize arithmetic and geometric sequences.I can write the explicit equation for arithmetic and geometric sequences.I can write the recursive rule for arithmetic and geometric sequences.I can graph arithmetic and geometric sequences.I can find any term in a sequence. |
| **Vocabulary:**Arithmetic Sequence Geometric SequenceLinear ExponentialCommon Difference Common RatioExplicit Equation Recursive Equation |
| **Assignments:**Lesson 9.1 – Arithmetic Sequences – Lesson 9.1 Practice WorksheetLesson 9.2 – Geometric Sequences – Lesson 9.2 Practice Worksheet |