Algebra 1 Unit 11: Comparing Linear, Quadratic, & Exponential Functions Notes

Figure 6	

a. Create an explicit rule for finding the number of triangles.

Day 2 – Recursive Formulas & More with Sequences

Information	Arithmetic	Geometric
Recursive Formula (allows you to find next term)	a_1 = first number $a_n = a_{n-1} + d$ a_n: nth term a_{n-1}: previous d: common diff	a_1 = first number $a_n = r(a_{n-1})$ a_n: nth term a_{n-1}: previous r: constant ratio

Generating a Sequence from a Recursive Formula

For each of the following recursive formulas, generate the first five terms.

a. $a_1 = 7$, $a_n = a_{n-1} + 4$ — a.

7, 11, 15, 19, 23

+4 +4 +4 +4

b. $a_1 = -54$, $a_n = \frac{1}{3}(a_{n-1})$ — r.

-54, -18, -6, -2, -2/3

·1/3 ·1/3

c. $a_1 = -3.5$, $a_n = a_{n-1} + 9$ — a

-3.5, 5.5, 14.5, 23.5, 32.5

+9

d. $a_1 = 4$, $a_n = 2(a_{n-1})$

4, 8, 16, 32, 64

·2 ·2

e. $a_1 = -7$, $a_n = a_{n-1} - 6$ — a

f. $a_1 = 1025$, $a_n = \left(\frac{1}{5}\right)(a_{n-1})$ — g

6

Creating Explicit and Recursive Formulas

For each of the following sequences, define the first term and common difference/constant ratio. Then create a simplified explicit formula and recursive formula.

a. 1, 8, 15 ...	b. 4, 0, -4 ...	c. 400, 200, 100 ...
Type: +7 +7 arithmetic	Type: -4 -4 arithmetic	Type: ÷2 ÷2 geometric
Explicit: $a_n = a_1 + d(n-1)$ $a_n = 1 + 7(n-1)$	Explicit: $a_n = a_1 + d(n-1)$ $a_n = 4 + -4(n-1)$	Explicit: $a_n = a_1 \cdot r^{n-1}$ $a_n = 400\left(\frac{1}{2}\right)^{n-1}$
Recursive: $a_n = a_{n-1} + d$ $a_n = a_{n-1} + 7$	Recursive: $a_n = a_{n-1} - 4$	Recursive: $a_n = r \cdot a_{n-1}$ $a_n = \left(\frac{1}{2}\right) a_{n-1}$
d. 3, 6, 12 ...	**e. -5, 3, 11 ...**	**f. 40, 10, $\frac{5}{2}$ ...**
Type:	Type:	Type:
Explicit:	Explicit:	Explicit:

Algebra 1 Unit 11: Comparing Linear, Quadratic, & Exponential Functions Notes

Recursive:	Recursive:	Recursive:

Challenge

a. Two terms of an arithmetic sequence are $a_5 = 15$ and $a_6 = 22$.

a. What is the common difference?

b. What are the first four terms of this sequence?

c. Write the **EXPLICIT** and **RECURSIVE** rules for this sequence.

b. Two terms of a geometric sequence are $a_5 = 162$ and $a_6 = 486$.

a. What is the constant ratio?

b. What are the first four terms of this sequence?

c. Write the **EXPLICIT** and **RECURSIVE** rules for this sequence.

c. Given $a_{10} = 16$ and $d = 5$, write the **EXPLICIT** and **RECURSIVE** rules for this sequence.