Unit 1 – Investigation 2

Sequences Warm-Up

What do I need to do to the last term to get the next term?

Quick Warm-Up: Identify the next 3 terms of the sequence. In words, explain the recursive rule.

1. 4, 7, 10, 13, … 16, 19, 22, Add 3

2. 1, 2, 4, 8, … 16, 32, 64 Times 2

3. -12, -8, -4, … 0, 4, 8 Add 4

4. 5, -10, 20, -40, … 80, -160, 320 Times -2

5. 20, 30, 45, 67.5, 101.25, … 151.875, 227.8125, 341.71875

$\frac{20}{20}x = \frac{30}{20}$ $\frac{30}{30}x = \frac{45}{30}$ 1.5

6. 9, -3, 1, -1/3, … $\frac{-1}{3} \times -3 = \frac{1}{9}$ $\frac{-1}{27}$ $\frac{1}{81}$

7. 1, 4, 9, 16, … 25, 36, 49 64 81 100 121 144 169

8. 1, 1, 2, 3, 5, 8, 13, … 21, 34, 55

Adding the 2 previous terms

Fibonacci Sequence

Recursive vs. Explicit Rules

Class Goals – By the end of the period, you will understand and be able to…

- Generate & Define sequences using recursive and explicit rules.
- Predict the value of a term in a sequence.
- Make & Justify Predictions.

Awesome Vocab

Recursive

What do I need to do to the last term to get the next term?

Explicit

Turns a sequence into a formula so you can figure out any term of the sequence.

Generating Sequences

Example #1 Identify the first 5 terms of the sequence. Then, explain the recursive rule.

a. $a_n = 3n + 1$

$a_1 = 3(1)+1 = 4$

$a_2 = 3(2)+1 = 7$

$a_3 = 3(3)+1 = 10$

$a_4 = 3(4)+1 = 13$

$a_5 = 3(5)+1 = 16$

4, 7, 10, 13, 16

b. $b_n = -2n + 12$

$b_1 = 10$

$b_2 = 8$

$b_3 = 6$

$b_4 = 4$

$b_5 = 2$

Subtract 2

c. $c_n = -3(2)^{n-1}$

Arithmetic

A sequence where the same number is being added or subtracted repeatedly

Geometric

A sequence where the same number is being Multiplied or Divided repeatedly

Arithmetic, Adding 5

Geometric, Multiplying 3

Example #2 Identify the recursive rule for the sequence. Then , write the explicit rule.

a. 12, 17, 22, 27, …

$a_0 + dn$

b. 12, 36, 108, 324, …

$4(3)^n$

$a_n = a_0(r)^n$

r ← Common Ratio

d: common difference

Write the Explicit Rule for #1–6 from the warm-up.

1.

2.

3.

4.

5.

6.