

Warm up

Solve by Elimination,

$$1) \quad 3x - y = 2$$

$$+ \quad 2x + y = 8$$

$$\underline{5x = 10} \quad 2(2) + y = 8$$

$$\frac{5x}{5} = \frac{10}{5}$$

$$x = 2$$

$$\begin{array}{r} 4 + y = 8 \\ -4 \quad -4 \\ \hline y = 4 \end{array}$$

Substitution

$$y = 3$$

$$y = 2x + 5$$

$$\begin{array}{r} 3 = 2x + 5 \\ -5 \quad -5 \\ \hline 2 = 2x \\ \frac{2}{2} = \frac{2x}{2} \\ x = 1 \end{array}$$

5-1 Arithmetic and Geometric Growth

Objectives:

I can determine the difference between an arithmetic and geometric sequence.

I can find a common difference or common factor from a sequence.

I can write the explicit and recursive equation for a sequence.

Vocabulary

Progression in a sequence

Arithmetic:

add or subtract

Common difference:

Geometric:

\times or \div

Common Ratio:

1, 3, 5, 7, 9
 \wedge \wedge \wedge
2 2 2

2, 4, 8, 16

3, 8, 13, 18, 23, ... 28, 33, 38

Next 3 terms:

Arithmetic or Geometric?

Common Difference/Ratio:

+ 5

11, 9, 7, 5, ... 3, 1, -1

Next 3 terms:

Arithmetic or Geometric?

Common Difference/Ratio:

-2

2, 4, 8, 16, ... $32, 64, 128$
Next 3 terms:

Arithmetic or Geometric?

Common Difference Ratio.

x2
..

3, 9, 27, ... 81, 243, 729

Next 3 terms:

10^{8th}

Arithmetic or Geometric?

Common Difference / Ratio:

.
x3

In the following figure, each triangle is created by 3 toothpicks



Figure 1

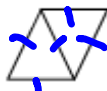


Figure 2

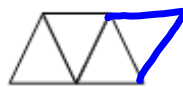


Figure 3

Figure	Toothpicks
1	3
2	5
3	7
4	9
5	11

Explicit: $a_n = a_1 + (n-1)d$
 $a_{50} = 3 + (50-1) \cdot 2 = 101$

Recursive: $f(n) = f(n-1) + 2$

Handwritten annotations: Blue arrows point from the table to the explicit formula. Green arrows point from the table to the recursive formula. A red arrow points from the explicit formula to the calculation of a_{50} .

You borrow \$470 from your parents to pay for a new iPhone. If you pay them back \$20 a week, starting this week, how many weeks will it be until you have it paid off?

$$a_n = a_1 + (n-1)d$$

$$470 = 20 + (n-1)20$$

$$-20 \quad -20$$

$$\frac{450}{20} = (n-1) \frac{20}{20}$$

$$22.5 = n-1$$

$$+1 \quad +1$$

$$23.5 = n$$