

Geometric Sequences 5-91

- a. The π Phone Company sold 100 of their new model the first week. After that the sales increased by 15% each week. How many did they sell in 4 weeks? n weeks? Fill in the table to help you find the rule.

Week	Support	Phone sales
0	100	100
1	$100(1.15)$	115
2	$115(1.15)$ or $100(1.15)(1.15)$	132
3	$132(1.15)$ or $100(1.15)(1.15)(1.15)$	152
4	$152(1.15)$ or $100(1.15)^4$	175
n	$t(n) = 100(1.15)^n$	

- b. This sequence is geometric because it increases/grows by multiplication.

- c. Recursive equation: $t(n+1) = 1.15 t(n)$ [OR] $t(n+1) = \text{multiply } [t(n)] \text{ (x 1.15)}$
 Recursive Equation to find Week 52 sales (if I knew week 51)

$$t(52) = 1.15 t(51)$$

- d. Given: $t(0) = 100$; Multiplier = 1.15

Explicit equation: $t(n) = 100(1.15)^n$ (Common ratio)

2 notations $\left\{ \begin{array}{l} t(n) = [t_0](\text{multiplier})^n \\ t_n = t_0(\text{multiplier})^n \end{array} \right.$

- e. Week 52 sales using the explicit equation.

$$t(52) = 100(1.15)^{52}$$

$$t(52) = 143,314$$

- f. Comparing arithmetic and geometric
Explicit equations

- Comparing arithmetic and geometric
Recursive equations

Similar	Different
<ul style="list-style-type: none"> • both need t_0 • allows us to find any term • both grow by constant number • Use $t(n)$ & t_n notation • Graphs are discrete 	<ul style="list-style-type: none"> • geometric "n" is an exponent arithmetic is a coefficient • Arithmetic / adds • Geometric / multiplies • Arithmetic is linear • Geometric is exponential

Similar	Different
<ul style="list-style-type: none"> • both based off previous output • both use $t(n+1)$ and t_n notation • Use recursive to find only next term 	<ul style="list-style-type: none"> • geometric multiplies by growth + arithmetic adds growth