# Arithmetic Sequences

**f(x) = mx + b**

IMPORTANT DEFINITIONS:

**SEQUENCE:** A Set of numbers (terms) often containing a pattern

Example: 2, 6, 10, 14 (0 1st 2nd 3rd)

**TERM:** the numbers in the sequence

What is the first term in the sequence? 2

What is the third term in the sequence? 10

What is the ZERO term in the sequence? -2

**COMMON DIFFERENCE:** The difference between the terms is the same.

(The amount each term increases or decreases.)

The variable used is d.

Ex ↑ Common difference d=4

**FUNCTION RULE:** Arithmetic Sequences

Zero term
- starting value
- y-intercept

f(x)=mx + b

common difference: slope, rate of change

**ARITHMETIC SEQUENCE:** When the common difference between CONSECUTIVE terms is the Same

0 term, 1st, 2nd, 3rd

Examples:

a.) 5, 7, 9, 11 ...

d = 2

Next 3 terms = 13, 15, 17

ZERO Term = 3

Write the FUNCTION RULE (equation) for the sequence.

f(x)=2x+3

Find the 21st term.

x=21

2(21)+3

42+3

45

b.) 8, 12, 16, 20 ...

d = 4

Next 3 terms = 24, 28, 32

Zero Term = 4

Write the FUNCTION RULE (equation) for the sequence.

f(x)=4x + 4

Find the 42nd term.

4·42 = 168

168+4

172

c.)

| x | y | |
|---|---|---|
| -1 | -4 | |
| 0 | -9 | -5 |
| 1 | -14 | |
| 2 | -19 | |
| 3 | -24 | |

x=0 → zero term

d = -5

Zero Term = -9

Next 3 Terms = -29, -34, -39

Write the FUNCTION RULE (equation) for the sequence.

f(x) = -5x + -9

Find the 28th term. f(x)=-5x -9

f(28) = -5(28) - 9

= -140 - 9

= -149

d.) 1, 3, 9, 27.... ...

d = NONE

NOTE

When there is no common difference it is NOT an arithmetic sequence.

**Looking at the function…**

a) $f(x) = -\frac{1}{5}x + 62$

What is the ZERO term? 62

What is the COMMON DIFFERENCE? $-1/5$

Next 3 terms $61\frac{4}{5}, 61\frac{3}{5}, 61\frac{2}{5}$

$62 - 1/5$

$61\frac{4}{5} - 1/5$

b) $y = 14x + 0.95$

What is the ZERO term? $-0.95$

What is the COMMON DIFFERENCE? 14

Find the FIRST 3 terms. 13.05, 27.05, 41.05

$0.95 + 14$

**Real Life Application:**

1. Suppose a cell phone service charges a base rate of $20 per month and $0.25 per minute for each call.

starting amt / zero term

rate of change / common diff.

a) Write a FUNCTION RULE (equation) for this situation.

$f(x) = .25x + 20$

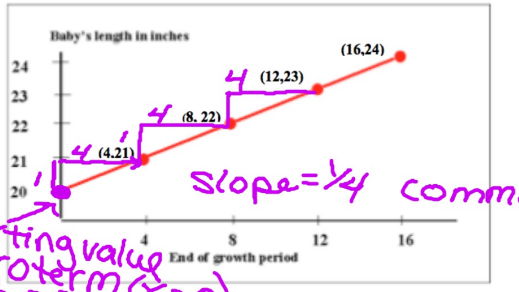
b) If you talked for 55 minutes last month, how much would you be charged (without taxes)?

$0.25(55) + 20$

$13.75 + 20$

$33.75

2. Babies grow really quickly. This graph compares a baby's growth period in months (x) to its length in inches (y).




slope = 1/4 common diff

Starting value / zero term ($x = 0$) / y-int. = 20

a) Write a FUNCTION RULE (equation) for a baby's growth.

$f(x) = 1/4x + 20$

b) When the baby is 2 years old, how many inches long will it be? (Hint: Change 2 years to months)

2 years = 24 months

$f(24) = 1/4(24) + 20$

$= 6 + 20$

$= 26$ inches