

Arithmetic Growth

sequence: an ordered list of numbers, where a mathematical pattern or rule is used to generate the next term in the list

Ex. 1) State the pattern and determine the next 3 terms:

a) 1, 5, 9, 13, ... *add 4*
17, 21, 25

b) 2, 6, 18, ... *multiply by 3*
54, 162, 486

c) 5, 3, 1, ... *subtract 2*
-1, -3, -5

d) 25, -5, 1, ... *divide by -5*
 $-\frac{1}{5}, \frac{1}{25}, -\frac{1}{125}$

e) 1, 1, 2, 3, 5, ... *add preceding 2 terms*
8, 13, 21

f) $1, 2, 5, 10, 17, \dots$ *add consecutive odd numbers*
26, 37, 50

A sequence is arithmetic if the terms are separated by a common difference. This means that the terms are generated by either adding or subtracting the same number each time.

Which of the sequences above are arithmetic?

a and c

Ex. 2) Determine the common difference and the next 2 terms.

a) 3, 8, 13, 18,
5

b) 1, 2.5, 4, 5.5,
1.5

c) 16, 13, 10, 7, ...
-3

Ex. 3) A person selling magazines earns \$41/day plus \$3 for every subscription sold. How much does the person earn per day by selling 2 subscriptions? 6 subscriptions?

$$\begin{aligned} 2 \text{ subscriptions: } & 41 + 2(3) \\ & = 41 + 6 \\ & = \$47 \end{aligned}$$

$$\begin{aligned} 6 \text{ subscriptions: } & 41 + 6(3) \\ & = 41 + 18 \\ & \$59 \end{aligned}$$

Ex. 4) Insert 3 numbers between 23 and 79 so that the numbers form an arithmetic sequence.

$$23, \underline{37}, \underline{51}, \underline{65}, 79$$

$$79 - 23 = 56$$

$$56 \div 4 = 14 \leftarrow \text{common difference.}$$