Arithmetic Sequence

Repeatedly adding the same number

Geometric Sequence

Repeatedly multiplying by the same number

Sec 11-2: Arithmetic Sequences

Created by adding the same number each time.

The difference between consecutive terms is constant.

d = Common Difference = any term - previous term

$$d = a_n - a_{n-1}$$

Recursive Formula for an Arithmetic Sequence:

7, 13, 19, 25, ... Find d.

$d = 13 - 7 = 6$

a_1 = The 1st Term

$a_n = a_{n-1} + d$

$a_1 = 7$

$a_n = a_{n-1} + 6$

Write the recursive formula for this sequence:

10, 23.5, 37, 50.5, ...

$d = 13.5$

$a_1 = 10$

$a_n = a_{n-1} + 13.5$

Write the recursive formula for this sequence:

56, 53, 50, 47, ... $d = -3$

$a_1 = 56$

$a_n = a_{n-1} + -3$

$a_{n-1} - 3$

Explicit Formula for an Arithmetic Sequence:

5, 9, 13, 17, 21, ... Find d.

$a_1 = 5$

$a_2 = 5 + 4$

$a_3 = 5 + 4 + 4$

$a_4 = 5 + 4 + 4 + 4$

$a_5 = 5 + 4 + 4 + 4 + 4$

Explicit Formula:

$a_n = 5 + 4(n - 1)$

Explicit Formula for any Arithmetic Sequence:

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

Write the explicit formula for this sequence:

47, 60, 73, 86, ...

arithmetic $d = 13$

$a_n = 47 + 13(n-1)$

Write the explicit formula for this sequence:

103, 95, 87, 79, ...

arithmetic $d = -8$

$a_n = 103 + -8(n-1)$

Find the 13th term for this sequence:

5, 8, 11, 14, ...

arithmetic $d = 3$

$a_n = 5 + 3(n-1)$

$a_{13} = 5 + 3(13-1) = 41$

Find the 99th term for this sequence:

32, 27, 22, 17, 12, ...

Arithmetic $d = -5$

$a_n = 32 - 5(n-1)$

$a_{99} = 32 - 5(99-1) = -458$

Given the two terms below are part of an Arithmetic Sequence, find the 16th term in the sequence.

$a_5 = 22$

$a_{23} = 94$

$a_{16} = ?$

Below is one way to find a_{16}. There are other ways.

find the common difference: $\frac{94-22}{23-5} = 4$

If $d = 4$ then $a_1 = 6$

6, 10, 14, 18, 22

a_1, , , , a_5

$a_n = 6 + 4(n-1)$

$a_{16} = 6 + 4(16-1)$

$a_{16} = 66$

You can now finish Hwk #30:

Sec 11-2

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Problems 2-5, 15, 16, 26, 27, 53, 54, 63

Sec 11-3: Geometric Sequence

Created by multiplying each term by the same number to get the next term..

The ratio between consecutive terms is constant.

r = Common Ratio

Find the Common Ratio (r) in each Geometric sequence.

1. 6, 18, 54, 162, ... $r = 3$

$r = \frac{18}{6}$

$$r = \frac{\text{Any term}}{\text{Previous term}} = \frac{a_n}{a_{n-1}}$$

2. 320, 80, 20, 5, ... $r = \frac{1}{4}$

$r = \frac{80}{320}$

Given the following Geometric Sequence

18, x , 882, ... Find the value of x

$18 \cdot r \cdot r = 882$

$18r^2 = 882$

$r^2 = 49$

$r = \pm 7$

OR

$\frac{a_n}{a_{n-1}} = \frac{a_n}{a_{n-1}}$ any where in the sequence

$\frac{x}{18} = \frac{882}{x}$

$\sqrt{x^2} = \sqrt{15876}$

18(7) 18(-7)

$x = 126$ or -126

$\sqrt{15876}$ $-\sqrt{15876}$

+x is called the Geometric Mean of 18 and 882.