Date: ____________________

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) recognize the characteristics of geometric sequences.
b) write the general term.

Last day's work: pp. 424-425 #1 – 13, 15, 16

2b
7c d b
13a

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2. State the general term and the recursive formula for each arithmetic sequence.

a) 28, 42, 56, ... b) $53 \xrightarrow{-4} 49 \xrightarrow{-4} 45$, ... c) −1, −111, −221, ...

$t_1 = 53 \quad t_2 = 49$

$a = 53$

$d = -4$

$t_n = a + (n-1)d$

$= 53 + (n-1)(-4)$

$= 53 - 4n + 4$

$t_n = -4n + 57$

$t_2 = -4(2) + 57$

$= -8 + 57$

$= 49$

$t_n = t_{n-1} + d, \quad t_1 = 53$

$= t_{n-1} + (-4)$

$= -4 + t_{n-1}$

$n = 2$

$t_2 = -4 + t_{2-1}$

$= -4 + t_1$

$= -4 + 53$

$= 49$

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7. **i)** Determine whether each recursive formula defines an arithmetic sequence, where $n \in \mathbf{N}$ and $n > 1$.

ii) If the sequence is arithmetic, state the first five terms and the common difference.

a) $t_1 = 13, t_n = 14 + t_{n-1}$

b) $t_1 = 5, t_n = 3t_{n-1}$

c) $t_1 = 4, t_n = t_{n-1} + n - 1$

d) $t_1 = 1, t_n = 2t_{n-1} - n + 2$

b) $t_2 = 3t_{2-1}$
$= 3t_1$
$= 3(5)$
$= 15$

$t_3 = 3t_{3-1}$
$= 3t_2$
$= 3(15)$
$= 45$

$\therefore 5, 15, 45, \ldots$

$\therefore$ not arithmetic

c) $t_1 = 4$

$t_2 = t_1 + 2 - 1$
$= 4 + 2 - 1$
$= 5$

$t_3 = t_2 + 3 - 1$
$= 5 + 3 - 1$
$= 7$

$\therefore 4, 5, 7, \ldots$ not arithmetic

d) $t_1 = 1$

$t_2 = 2t_1 - 2 + 2$
$= 2(1) + 0$
$= 2$

$t_3 = 2t_2 - 3 + 2$
$= 2(2) - 1$
$= 3$

$t_4 = 2t_3 - 4 + 2$
$= 2(3) - 2$
$= 4$

$t_5 = 2t_4 - 5 + 2$
$= 2(4) - 3$
$= 5$

$\therefore 1, 2, 3, 4, 5, \ldots$ is arithmetic.

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13. Determine the number of terms in each arithmetic sequence.

a) 7, 9, 11, 13, ... , 63
b) −20, −25, −30, −35, ... , −205
c) 31, 27, 23, 19, ... , −25
d) 9, 16, 23, 30, ... , 100
e) −33, −26, −19, −12, ... , 86
f) 28, 19, 10, 1, ... , −44

a seq. $t_n = a + (n-1)d$

$a = 7$ $\quad = 7 + (n-1)(2)$

$d = 2$ $\quad = 7 + 2n - 2$

$n = ?$ $\quad t_n = 2n + 5$

$63 = 2n + 5$

$63 - 5 = 2n$

$58 = 2n$

$n = 29$

∴ there are 29 terms in the sequence.

7.2 Geometric Sequences

Date: May 28/18

Geometric Sequence:
A sequence that has a common **ratio** between the terms.
(ie. you multiply by some number to move from one term to the next).

Ex.1 Consider the following sequence: $2 \xrightarrow{\times 3} 6 \xrightarrow{\times 3} 18 \xrightarrow{\times 3} 54, \ldots$

In a geometric sequence, the first term is a and the common **ratio** is r
the terms are $a, ar, ar^2, ar^3, \ldots$

often only 3 terms given

The general term is $t_n = ar^{n-1}$

The recursive formula is $t_1 = a$, $t_n = rt_{n-1}$, n **N**, n > 1

a) What is the 11th term?

t_{11}=118 098

g.seq: $a=2$ $r=3$ $n=11$

$t_n = ar^{n-1}$

$t_{11} = (2)(3)^{11-1}$

$= 2(3)^{10}$

$= 118098$

Ex.2 The fifth term of a geometric sequence is 48, and the 13th term is 12288. Determine the first 4 terms.

$a = 3, r = 2$
$t_1 = 3$, $t_2 = 6$, $t_3 = 12$, $t_4 = 24$

g.seq. $t_n = ar^{n-1}$

$48 = ar^{5-1}$

$48 = ar^4$

$t_{13}: \ 12288 = ar^{12}$

$\left(\frac{t_{13}}{t_5}\right): \ \frac{12288}{48} = \frac{\cancel{a}r^{12}}{\cancel{a}r^4}$

$256 = r^{12-4}$

$256 = r^8$

$\sqrt[8]{256} = r$

$r = 2$

Sub $r = 2$

$ar^4 = 48$

$a(2)^4 = 48$

$a(16) = 48$

$a = 3$

$t_n = ar^{n-1}$

$t_1 = a$

$t_1 = 3$

$t_2 = ar^{2-1}$
$= 3(2)^1$
$= 6$

$t_3 = 3(2)^2$
$= 12$

$t_4 = 3(2)^3$
$= 24$

$\therefore$ the first 4 terms are:
3, 6, 12, 24.

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 424-425 #1 – 13, 15, 16

Study for the Unit 6 Summative!

Today's Homework Practice includes:

p. 426 A – H
pp. 430-432 #1 – 3, 5 – 11 [18-20]