Spiral Review

Use the graphing calculator, find the first five terms of the sequence.

1. $a_n = 3n - 5$

$a_1 = -2$

$a_2 = 1$

$a_3 = 4$

$a_4 = 7$

$a_5 = 10$

2. $a_n = 6 + 3(-1)^n$

$a_1 = 3$

$a_2 = 9$

$a_3 = 3$

$a_4 = 9$

$a_5 = 3$

p.581 8.2 Arithmetic Sequences

A sequence whose consecutive terms have a common difference is called an **<u>arithmetic sequence</u>**.

Finding the nth term:

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

first term

common difference

Finding the sum:

$S_n = n/2\ (a_1 + a_n)$

what you get from 1st # (start)

what you get from last # (stop)

Students will be able to determine if a sequence is arithmetic and find the common difference.

Example 1: Determine whether or not the sequence is arithmetic. If it is, find the common difference.

a.) $4, 9, 14, 19, 24, \ldots$

$+5 \quad +5 \quad +5 \quad +5$

$\boxed{\text{yes it is an arithmetic sequence.}}$

$\boxed{d=5}$

b.) $a_n = 2^{n-1}$

$1, 2, 4, 8, 16, \ldots$

$+1 \quad +2$

$\boxed{\text{not an arithmetic sequence}}$

Students will be able to find the formula for the arithmetic sequence.

Example 2: Find a formula for a_n for the arithmetic sequence.

a.) $a_1 = 15, d = 4$

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

$= 15 + (n-1)4$

$= 15 + 4n - 4$

$\boxed{a_n = 11 + 4n}$

b.) $a_5 = 190, a_{10} = 115$

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

$115 = 190 + 5d$

$d = -15$

$a_n = 250 + (n-1)(-15)$

$= 250 - 15n + 15$

$\boxed{a_n = 265 - 15n}$

Students will be able to write the first five terms of the arithmetic sequence.

Example 3: Write the first five terms of the arithmetic sequence. (Use graphing calculator)

a.) $a_1 = -10$, $d = 9$

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

$= -10 + (n-1)9$

$= -10 + 9n - 9$

$\boxed{a_n = -19 + 9n}$

$-10, -1, 8, 17, 26$

b.) $a_5 = 16$, $a_{14} = 38.5$

$38.5 = 16 + 9d$

$-16 \quad -16$

$\frac{22.5}{9} = \frac{9d}{9}$

$d = 2.5$

$a_5 = 16$
$a_4 = 13.5$
$a_3 = 11$
$a_2 = 8.5$
$a_1 = 6$

Students will be able to write the first five terms of the arithmetic sequence, and find the common difference.

Example 4: Write the first five terms of the arithmetic sequence. Find the common difference and write the nth term of the sequence as a function of n.

a.) $a_1 = 6$, $a_{k+1} = a_k + 5$

$a_1 = 6$
$a_2 = 11$
$a_3 = 16$
$a_4 = 21$
$a_5 = 26$

$\boxed{d = 5}$

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

$= 6 + (n-1)5$

$= 6 + 5n - 5$

$\boxed{a_n = 1 + 5n}$

b.) $a_1 = 1.5$, $a_{k+1} = a_k - 2.5$

$a_1 = 1.5$
$a_2 = -1$
$a_3 = -3.5$
$a_4 = -6$
$a_5 = -8.5$

$\boxed{d = -2.5}$

$a_n = 1.5 + (n-1)(-2.5)$

$= 1.5 - 2.5n + 2.5$

$\boxed{a_n = 4 - 2.5n}$

Students will be able to find the partial sum of the arithmetic sequence.

Eample 5: Find the indicated nth partial sum of the arithmetic sequence.

a.) 2, 8, 14, 20,...;n = 25

$S_n = \frac{n}{2}(a_1 + a_n)$

$= \frac{25}{2}(2 + 146)$

$= \frac{25}{2}(148)$

$\boxed{S_n = 1850}$

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

$= 2 + (n-1)6$

$= 2 + 6n - 6$

$a_n = -4 + 6n$

$a_{25} = 146$

b.) $a_1 = 15$, $a_{100} = 307$, n = 100

$S_n = \frac{n}{2}(a_1 + a_n)$

$= \frac{100}{2}(15 + 307)$

$= \frac{100}{2}(322)$

$\boxed{S_n = 16{,}100}$

Students will be able to find the sum of the arithmetic sequence without using the calculator.

Example 6: Find the partial sum without using a graphing calculator.

a.) $\sum_{n=1}^{100} 2n$

$S_n = \frac{n}{2}(a_1 + a_n)$

$= \frac{100}{2}(2 + 200)$

$= 50(202)$

$= \boxed{10{,}100}$

b.) $\sum_{n=51}^{100} n - \sum_{n=1}^{50} n$

$S_n = \frac{50}{2}(51 + 100)$

$= 25(151)$

$= 3775$

$S_n = \frac{50}{2}(1 + 50)$

$= 25(51)$

$= 1275$

$3775 - 1275$

$= \boxed{2500}$

Turn-in:
p.586 (14, 24, 34, 68)

HW:
p.586 (5,11,17,21-41, 65-75 odds)