SEC 9.2 ARITHMETIC SEQUENCES

1. ARITHMETIC SEQUENCES: a_1 IS THE FIRST TERM, AND d IS THE COMMON DIFFERENCE.

$a_1,\ a_1+d,\ a_1+d+d,\ a_1+d+d+d,\ \ldots.$

$a_1,\ a_1+d,\ a_1+2d,\ a_1+3d$

↑ 1ST TERM ↑ 2ND TERM ↑ 3RD TERM ↑ 4TH TERM

$$a_n = a_1 + (n-1)d$$ ← NEEDS TO BE MEMORIZED

EX. 1, 4, 7, 10

+3 +3 +3

2. COMMON DIFFERENCE

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

$10 - 7$

$d = 3$

$a_1 = 1$ FIRST TERM

$$a_n = a_1 + (n-1)d$$
$$a_n = 1 + (n-1)3$$
$$a_n = 1 + 3n - 3$$
$$a_n = 3n - 2$$

3. FIND THE PARTIAL SUM OF AN ARITHMETIC SEQUENCE.

$$S_n = a_1 + (a_1+d) + (a_1+2d) + \ldots + (a_1+(n-1)d)$$

OR — # OF TERMS

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

S_n: SUM OF N TERMS; a_1: 1ST TERM; a_n: LAST TERM

#39 (TEXTBOOK)

$a_1 = 1$ $\quad d = 2$ $\quad n = 10$

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

$$S_{10} = \frac{10}{2}(1 + 19)$$

$$5(20)$$

$$S_{10} = 100$$

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

$a_{10} = 1 + (10-1)2$

$1 + 9 \cdot 2$

$1 + 18$

$a_{10} = 19$

SUMMATION NOTATION FORM

$a_n = 1 + (n-1)2$

$1 + 2n - 2$

$2n - 1$

$$\sum_{n=1}^{10} 2n-1 = 1+3+5+7+9+11+13+15+17+19$$

$$20 + 20 + 20 + 20 + 20 = 100$$

sec.

(9.2) 55. $a_1 = 5, \quad d = 2$

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

$5 + (n-1)2$

$5 + 2n - 2$

$a_n = 2n + 3$

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

$2700 = \frac{n}{2}(5 + 2n + 3)$

$2700 = \frac{n}{2}(2n + 8)$

$-2700 \quad -2700$

$0 = n^2 + 4n - 2700$

$(n - 50)(n + 54)$ $\{50, -54\}$

50 TERMS

Check

$25(5 + 103)$

$25 \cdot 108$

2700 ✓

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \cdot 1 \cdot (-2700)}}{2 \cdot 1}$$

$$\frac{-4 \pm \sqrt{16 + 10800}}{2}$$

$$\frac{-4 \pm \sqrt{10816}}{2}$$

$$\frac{-4 \pm 104}{2} \qquad \frac{100}{2} \quad \frac{-108}{2}$$

$50 \quad -54$