Section 11.2: cont'd

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12:40 PM

recall:

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

$$= \frac{n}{2}[2a_1 + (n-1)d]$$

arithmetic series

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example: find the sum of the first fifty terms of $2 + 5 + 8 + \ldots$

arithmetic: $d = 3$, $a_1 = 2$, $n = 50$

method #1:

$$S_n = \frac{n}{2}[2a_1 + (n-1)d]$$

$$= \frac{50}{2}[2 \cdot 2 + 49 \cdot 3]$$

$$= 3775$$

method #2:

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

↑ what's this?

$$a_n = a_1 + (n-1)d$$
$$= 2 + 49 \cdot 3$$
$$= 149$$

$$S_n = \frac{50}{2}(2 + 149)$$

$$= 3775$$

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example:

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evaluate $\sum_{k=4}^{50} (6k-3)$

$$\sum_{k=4}^{50} (6k-3) = (6\cdot 4-3) + (6\cdot 5-3) + (6\cdot 6-3) + \dots (6\cdot 50-3)$$

$$= 21 + 27 + 33 + \dots + 297$$

arithmetic with $d = 6$

$n = 47$ $(= \text{last} - \text{first} + 1)$

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

$$= \frac{47}{2}(21 + 297)$$

$$= 7473$$