

19-1 & 19-2 Application Problems

1. \$300, \$500, \$700, ... $d=200$

a) $a_n = 300 + (n-1)(200)$

$$a_n = 300 + 200n - 200$$

$$a_n = 200n + 100$$

b) $4500 = 100 + 200n$ 22 days

$$4400 = 200n$$

$$22 = n$$

2. $a_1 = 25$

$$a_2 = 27$$

$$a_3 = 29$$

:

$$a_{12} = ?$$

a) $a_n = 25 + (n-1)2$

$$a_{12} = 25 + (12-1)2$$

$$= 25 + 11 \cdot 2$$

$$= 47$$

12th row has 47 seats

b) $S_{12} = \frac{12}{2}(25 + 47)$ \leftarrow Rows 13-19

$$= 432 + 47(7)$$

$$432 + 329$$

$$= 761 \text{ seats total}$$

3. 20 seconds \rightarrow 1.15 inches

$$n = \frac{1}{3} \text{ minutes} \mid 20 \text{ seconds}$$

$$a_n = 1.15 + (n-1)1.15$$

$$8.5 = 1.15 + (n-1)1.15$$

$$7.35 = 1.15(n-1)$$

$$6.39 = n-1$$

$$7.39 = n$$

$$7.39 / 3 = \boxed{2.46 \text{ minutes}}$$

4. SKIP

5. 21, 19, 17, 15, ... ; 8 terms

$$\sum_{n=1}^8 21 + (n-1)(-2)$$

or

$$\begin{aligned} a_n &= 21 + (n-1)(-2) \\ &= 21 + -2n + 2 \\ &= -2n + 23 \end{aligned}$$

$$\sum_{n=1}^8 -2n + 23 = 112$$

6. 4, 7, 10, 13, 16, 19, ... ; 10 terms

$$\begin{aligned} a_n &= 4 + (n-1)(3) \\ &= 4 + 3n - 3 \\ &= 3n + 1 \end{aligned}$$

$$\sum_{n=1}^{10} 3n + 1 = 175$$

7. 10, 12, 14, ...

Sold 108 in week 50

$$\begin{aligned} a_n &= 10 + (n-1)2 \\ a_{50} &= 10 + (49)(2) \\ &= 108 \end{aligned}$$

$$\begin{aligned} S_{50} &= \frac{50}{2} (10 + 108) \\ &= 2950 \end{aligned}$$

2,950 total sales

8. $11, 16, 21, \dots$

a) $\frac{1}{2}$ hour = 30 min

$$a_n = 11 + (n-1)5$$

$$a_{30} = 11 + 29 \cdot 5$$

$$a_{30} = 156$$

$$S_{30} = \frac{30}{2} (11 + 156) = 2505$$

2505 people total

b) 45 minutes

$$a_{45} = 11 + 44 \cdot 5$$

$$= 231$$

$$S_{45} = \frac{45}{2} (11 + 231) = 5445$$

5445 people total

c) 55 minutes

$$a_{55} = 11 + 54 \cdot 5$$

$$= 281$$

$$S_{55} = \frac{55}{2} (11 + 281) = 8030$$

8030 people total

9. $2, 3, 4, \dots$

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

$$a_n = n + 1$$

c) $a_{17} = 17 + 1$

$$a_{17} = 18$$

18 cans in the 17th row

b) $\sum_{n=1}^9 n+1 = 54$

SKIP \rightarrow d) $S_n = \frac{n}{2} (a + a_n)$
 $110 = \frac{n}{2} (2 + a_n)$
can't solve w/ 2 unknowns

10. $\sum_{n=3}^9 -8 + \frac{3n-3}{4} - \sum_{n=-10}^7 5 + \frac{5n-5}{4}$ } Calculator!

B. -118.2

11. $\sum_{n=8}^{13} 1 - \frac{n-1}{2} = -22.5$ } Calculator!