4. $\{9, 17, 25 \ldots\}$

$a = 9 \quad d = 8 \quad S_n = 636$

$\Rightarrow S_n = \frac{n}{2}\{2a + (n-1)d\}$

$\Rightarrow 636 = \frac{n}{2}\{18 + (n-1)8\}$

$\Rightarrow 1272 = n\{18 - 8 + 8n\}$

$\Rightarrow 1272 = n\{8n + 10\}$

$\Rightarrow 1272 = 2n\{4n + 5\}$

$\Rightarrow 636 = 4n^2 + 5n$

$\Rightarrow 4n^2 + 5n - 636 = 0$

$\Rightarrow 4n^2 + 53n - 48n - 636$

$\Rightarrow 4n(n - 12) + 53(n - 12)$

$n = 12$

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5 ~~$a=5 \quad S_n=400$~~

6. $a=17 \quad a_n=350 \quad d=9$

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

$350 = 17+(n-1)9$

$350 = 17+9n-9$

$350 = 8+9n$

$342 = 9n$

$38 = n$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$= \frac{38}{2}\{34+37\times9\}$

$= 19\{34+333\}$

$= 19\times367$

$= 6973$

7. $d=7 \quad n=22 \quad a_n=149$

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

$149 = a+21\times7$

$149 = a+147$

$2 = a$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$= 11\{4+21\times7\}$

$= 11\{4+147\}$

$= 11\times151$

$= 1661$

8. $a_2=14 \quad a_3=18$

$a+d=14 \quad a+2d=18$

$d=4$

$a=10$

$S_{51} = \frac{n}{2}\{2a+(n-1)d\}$

$= \frac{51}{2}\{20+200\}$

$= \frac{51}{2}\times220$

$= 51\times110$

$= 5610$

9. $S_7 = 49$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$49 = \frac{7}{2}\{2a+6d\}$

$49 = 7\{a+3d\}$

$7 = a+3d$

$S_{17} = 289$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$289 = \frac{17}{2}\{2a+16d\}$

$289 = 17\{a+8d\}$

$17 = a+8d$

$a+8d = 17$

$a+3d = 7$

$5d = 10$ $\quad d = 2$

$a = 1$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

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

$S_n = \frac{n}{2}\{2+2n-2\}$

$S_n = \frac{n}{2}\{2n\}$

$S_n = n^2$

12. $\{6, 12, 18, 24, 30, \ldots 240\}$

$a = 6 \quad d = 6$

$S_{40} = \frac{n}{2}\{2a+(n-1)d\}$

$S_{40} = \frac{40}{2}\{12+39\times6\}$

$S_{40} = 20\{12+234\}$

$S_{40} = 20\{246\}$

$S_{40} = 4920$

13. $\{8, 16, 24, 32, \ldots 90\}$

$a = 8 \quad d = 8$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$S_{15} = \frac{15}{2}\{16+14\times8\}$

$S_{15} = \frac{15}{2}\{16+112\}$

$S_{15} = \frac{15}{2}\{128\}$

$S_{15} = 15\times64$

$S_{15} = 960$

14. $\{1, 3, 5, 7, 9 \ldots 49\}$

$a = 1 \quad d = 2 \quad a_n = 49$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$S_{25} = \frac{25}{2}\{2+24\times2\}$

$S_{25} = \frac{25}{2}\{2+48\}$

$S_{25} = \frac{25}{2}\{50\}$

$S_{25} = 25\times25$

$S_{25} = 625$

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

$49 = 1+2n-2$

$49 = 2n-1$

$50 = 2n$

$25 = n$

16. $a=5 \quad l=45 \quad s=400$

$400 = \frac{n}{2}\{50\}$

$400 = 25n$

$16 = n$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$400 = 8\{10+(15d\}$

$400 = 80+120d$

$320 = 120d$

$8\frac{320}{120} = d \qquad d = \frac{8}{3}$

3

17. $3(1+2+3\ldots\ldots 12)$

$a=1 \quad d=1 \quad n=12$

$S_n = \frac{n}{2}\{2a+(n-1)d\}$

$= 6\{2+11\}$

$= 6 \times 13$

$= 78 \times 3$

$= 234$

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15 $\{200, 250, 300 \ldots\}$

$a = 200 \quad d = 50 \quad n = 30$

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

$a_{30} = 200 + 29 \times 50$

$a_{30} = 200 + 1450$

$a_{30} = 1650$

$S_n = \frac{n}{2}\{2a + (n-1)d\}$

$S_{15} = 15\{400 + 29 \times 50\}$

$S_{15} = 15\{400 + 1450\}$

$S_{15} = 15\{1850\}$

$S_{15} = 15 \times 1850$

$= 27750$

16. $S_7 = 700$

$d = -20$

let one be $= a - 20$

2nd be $= a - 20 - 20 = a - 40$

$S_n = \frac{n}{2}\{2a + (n-1)d\}$

$700 = \frac{7}{2}\{2a + 6x - 20\}$

$\frac{7}{2}\{2a - 120\}$

$100 = a - 60$

$160 = a$

$a = 160$

$a - 20 = 140$

$a - 40 = 120$

$a - 60 = 100$

$a - 80 = 80$

$a - 100 = 60$

$a - 120 = 40$

18. $\{0.5, 1.0, 1.5, 2.0 \ldots\}$

$a = 0.5 \quad d = 0.5 \quad n = 13$

$S_{13} = \frac{13}{2}\{2a + (n-1)d\}$

$S_{13} = \frac{13}{2}\{1 + (n-1)0.5\}$

$S_{13} = 13/2\{4 + 12 \times 0.5\}$

$S_{13} = \frac{13}{2}\{7\}$

$S_{13} = \frac{22}{7} \times \frac{21}{2}$

$S_{13} = 143$

19. no of logs in 1st row = 20
no of logs in 2nd row = 19
no of logs in 3rd row = 18

$AP = \{20, 19, 18, \ldots\}$
$a = 20 \quad d = -1$

let no. of rows $= n$

$$S_n = \frac{n}{2}\{2a + (n-1)d\} = 200$$
$$200 = \frac{n}{2}\{40 + (n-1)(-1)\}$$
$$200 = \frac{n}{2}\{40 - n + 1\}$$
$$200 = \frac{n}{2}\{41 - n\}$$
$$-n^2 + 41n = 400$$
$$n^2 - 41n + 400 = 0$$
$$n^2 - 16n - 25n + 400$$
$$n(n-16) - 25(n-16)$$
$$n = 16$$

$$a_{25} = a + 24d$$
$$= 20 - 24$$
$$= -4 \quad (n)$$

$$a_{16} = a + 15d$$
$$= 20 + 15 \times -1$$
$$= 20 - 15$$
$$= 5$$

20. $a = 10 \quad d = 6$

$n = 10$

$\{10, 16, 22, 28, 34\}$

$$S_n = \left(\frac{10}{2}\right)\{2 \times 10 + 9 \times 6\}$$

$$S_n = 5\{20 + 54\}$$

$$= 5 \times 74$$

$$= 370$$