HW(HL) 5F: 4c, 8 5G: 1ce, 2a, 3a, 8, 10, 13, 16, 19
(SL) 5F: 5c, 9 5G: 2ce, 3a, 5a, 11, 14, 18, 20

5F: 4c.) $\sum_{k=1}^{4}(3k-5) \Rightarrow (3(1)-5)+(3(2)-5)+(3(3)-5)+(3(4)-5)$

$\Rightarrow -2 + 1 + 4 + 7$

$= \boxed{10}$

8.) n positive odd integers: $u_k = 2k-1$ (formula for odd integers beginning w/ 1)

$2(n-1)-1$

Step 1: $\sum_{k=1}^{n}(2k-1) = \underset{1}{1} + \underset{2}{3} + \ldots + \underset{n-1}{2n-3} + \underset{n}{2n-1}$

Step 2: $+\ \sum_{k=1}^{n}(2k-1) = 2n-1 + 2n-3 + \ldots + 3 + 1$

Step 3: $2\sum_{k=1}^{n}(2k-1) = 2n + 2n + \ldots + 2n + 2n$

Step 4: $\frac{2\sum_{k=1}^{n}(2k-1)}{2} = \frac{n(2n)}{2} = \frac{2n^2}{2}$

Check: If true, the sum of the first 5 odd numbers is 25.
$1+3+5+7+9 = 25$ ✓

Step 5: $\boxed{\sum_{k=1}^{n}(2k-1) = n^2}$

5G: 1c.) $\frac{1}{2} + 3 + 5\frac{1}{2} + 8 + \ldots$ to 50 terms $\therefore u_1 = \frac{1}{2}$ $d = 2\frac{1}{2}$ $n = 50$

$S_n = \frac{n}{2}(2u_1 + (n-1)d) \Rightarrow S_{50} = \frac{50}{2}(2(\frac{1}{2}) + (50-1)(2\frac{1}{2}))$

$\Rightarrow S_{50} = 25(1 + 49(2\frac{1}{2}))$

$= 25(123.5)$

$\boxed{S_{50} = 3,087.5}$

1e.) $(-31)+(-28)+(-25)+(-22)+\ldots$ to 15 terms

$\therefore u_1=-31 \quad d=3 \quad n=15 \qquad S_n=\frac{n}{2}(2u_1+(n-1)d)$

$\Rightarrow S_{15}=\frac{15}{2}(2(-31)+(14)(3)) \Rightarrow 7.5(-62+42) \Rightarrow 7.5(-20)$

$\Rightarrow \boxed{S_{15}=-150}$

2a.) $5+8+11+14+\ldots+101 \quad u_1=5 \quad d=3 \quad u_n=101$

need to know n (which term is 101? use $u_n=u_1+(n-1)d$)

$101=5+(n-1)(3)$

$101=5+3n-3 \qquad S_n=\frac{n}{2}(u_1+u_n) \therefore S_{33}=\frac{33}{2}(5+101)$

$101=3n+2$

$99=3n \qquad S_{33}=16.5(106)=\boxed{1,749}$

$n=33$

3a.) $\sum_{k=1}^{10}(2k+5) \qquad u_1=2(1)+5 \quad u_{10}=2(10)+5 \quad n=10$

$\therefore u_1=7 \qquad \therefore u_{10}=25$

$S_n=\frac{n}{2}(u_1+u_n) \Rightarrow S_{10}=\frac{10}{2}(7+25) \Rightarrow 5(32)=\boxed{160}$

8.) general info for # of seats in each section

$u_1=22 \quad d=1 \quad n=44$

a.) # of seats in the last row: $u_{44}=22+(43)(1)=22+43=\boxed{65 \text{ seats}}$

b.) total seats in a section: $S_{44}=\frac{44}{2}(22+65)=22(87)=\boxed{1,914 \text{ seats}}$

c.) the whole stadium? 25 sections of 1,914 seats $\therefore 25(1,914)=\boxed{47,850}$

10.) $k-1,\ 2k+3,\ 27-k \qquad$ a.) $2k+3-(k-1)=27-k-(2k+3)$

$\therefore 4,\ 13,\ 22$ & $d=9 \qquad 2k+3-k+1=27-k-2k-3$

b.) $n=25,\ u_1=4,\ d=9 \qquad k+4=-3k+24$

$S_{25}=\frac{25}{2}(2(4)+(24)(9)) \qquad 4k=20$

$\boxed{k=5}$

$=12.5(8+216)=12.5(224)=\boxed{2800}$

13.) $u_1 = 4$ $d = 6$ $S_n = 200$ $S_n = \frac{n}{2}(2u_1 + (n-1)d)$

$\Rightarrow 200 = \frac{n}{2}(2(4) + (n-1)(6)) \Rightarrow 400 = n(8 + 6n - 6)$

$\Rightarrow 400 = n(6n + 2)$

$400 = 6n^2 + 2n$ solve quadratic

$0 = 6n^2 + 2n - 400$

$0 = 2(3n^2 + n - 200)$

-600

25 -24

1

$(3n^2 + 25n)(-24n - 200) = 0$

$n(3n + 25) - 8(3n + 25) = 0$

$(n - 8)(3n + 25) = 0$

$\therefore n - 8 = 0$ $3n + 25 = 0$

$\boxed{n = 8}$ $n = \cancel{-25}/3$

n cant be negative

16.) Sum of first n (positive) integers is $\frac{n(n+1)}{2}$.

$u_1 = 1$ $d = 1$ $u_n = u_1 + (n-1)(d)$

$\& \; n = n$ $= 1 + (n-1)(1)$ $\therefore S_n = \frac{n}{2}(u_1 + u_n)$

$= 1 + n - 1$

$= n$ $= \frac{n}{2}(1 + n) \Rightarrow \boxed{\frac{n(n+1)}{2}}$

19.) $S_{15} = 480$ Find u_8. $u_8 = u_1 + 7d$ need to know u_1 & d

$480 = \frac{15}{2}(2u_1 + 14d)$ factor out a 2

$\therefore 480 = \frac{15(2)}{2}(u_1 + 7d)$ u_8!

$\Rightarrow \frac{480}{15} = \frac{\cancel{15} u_8}{\cancel{15}}$ $\boxed{u_8 = 32}$

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