Year: Month: Day: | | تکلیف شماره ۱۱ Subject: سارا عزیزی

(1)
$1^4+0 \quad 2^2+1 \quad 3^2+3 \quad 4^2+6$
$(1) \quad (2) \quad (3) \quad (4)$
$\to a_n = n^2+\frac{n(n-1)}{2} \to a_{10}=100+\frac{10\times 9}{2}=\boxed{145}$

(2)
$0 \quad 1 \quad 3$
$(1) \quad (2) \quad (3)$
$a_n=\frac{n(n-1)}{2} \to \frac{n(n-1)}{2}=55 \to n(n-1)=110 \to \boxed{n=11}$

(3)
$5, 9, 13, \ldots \to a_n=4n+1 \to a_{11}=44+1=45 \to$ رنگی
$5, 13, 21, \ldots \to a_n=8n-3 \to a_{11}=88-3=85 \to$ کل
$\to$ کل + رنگی $=45+85=130$

(4)
$a_1=\frac{-1}{1}=-1, \; a_2=\frac{1}{2}, \; a_3=\frac{-1}{3}, \; a_4=\frac{1}{4} \to$ هرچه جلوتر میریم به صفر نزدیک‌تر میشیم $\to \frac{1}{2}-(-1)=\boxed{\frac{3}{2}}$
پس کوچکترین عدد عدد اول و بزرگترین عدد دومه

(5)
$b_3=(-3)^3-7\times 3=-27-21=-48=-5n+22 \to 5n=70 \to \boxed{n=14}$

(6)
$a_{10}-a_7=12 \to a+9d-(a+9d)=a+9d-a-6d=3d=12 \to d=4$
$a_6-a=a+5d-a=5d=5\times 4=\boxed{20}$

(7)
$a_2=7, a_4=15 \to d=\frac{15-7}{4-2}=\frac{8}{2}=4 \to \underset{a_1}{3}, 7, \underset{a_3}{11}, 15, \ldots \to 4n-1=a_n$
$b_1=3, \; b_2=11 \to d=\frac{11-3}{2-1}=8 \to 3, 11, 19, \ldots \to \boxed{8n-5=b_n}$

(8)
$\frac{2}{5}, \frac{6}{7}, \frac{10}{9}, \frac{14}{11} \to \frac{4n-2}{2n+3}<\frac{3}{2} \to 8n-4<6n+9 \to 2n<13 \to n<6.5$
$n<7 \to$ $\boxed{\text{۶ تا}}$

(9)
$t_n = 6, 9, 9, 6, 0, \ldots \quad A=-\frac{3}{2} \quad C=0 \to t_n=-\frac{3}{2}n^2+Bn \to t_1=-\frac{3}{2}+B=6$
$3 \quad 0 \quad -3 \quad -6$
$-3 \quad -3 \quad -3 \quad -3$
$\to B=7.5 \to 3A+5B=3\times(-\frac{3}{2})+5(\frac{15}{2})=-\frac{9}{2}+\frac{75}{2}=\frac{66}{2}=\boxed{33}$

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$t_n = -6,\ -4,\ 0,\ 6,\ \dots$ (differences $+2,\ +4,\ +6$; second differences $+2,\ +2$)

$a=1 \quad c=-6 \rightarrow t_n = an^2+bn+c = n^2+bn-6$

$\rightarrow a_1 = 1+b-6 = -6 \rightarrow b=-1 \rightarrow t_n = n^2-n-6$

$a_2 = 31 ,\ a_4 = 41 \rightarrow \dfrac{41-31}{4-2} = \dfrac{10}{2} = 5 = d \rightarrow a_n = 5n+21$

$\rightarrow n^2-n-6 = 5n+21 \rightarrow n^2-6n-27 = 0 \rightarrow (n-9)(n+3) = 0 \rightarrow \boxed{n=9}$ ، $n=-3$ ✗

$\rightarrow a_9 = 45+21 = 66$