نام و نام خانوادگی: امیرعباس عادلی ۱۶ پاسخنامه تشریحی تکلیف شماره ۱۳ کلاس دهم B

$$a_1=40,\ a_4=61 \Rightarrow d=\frac{a_4-a_1}{4-1}=\frac{61-40}{3}=\frac{21}{3}=7 \Rightarrow d=7$$

$a_n=7n+b \Rightarrow a_1=7+b=40 \Rightarrow b=33 \Rightarrow a_n=7n+33 \Rightarrow$ ۱

$a_x=7x+33=208 \Rightarrow 7x=208-33=175 \Rightarrow \boxed{x=25} \Rightarrow \boxed{a_{25}=208}$

۲

عدد سه رقمی $\frac{7}{3}\Big|\frac{}{n} \Rightarrow 7n+3 =$ عدد سه رقمی $\Rightarrow 999 \geq 7n+3 \geq 100 \Rightarrow 996 \geq 7n \geq 97 \Rightarrow$

$\frac{996}{7} \geq n \geq \frac{97}{7} \Rightarrow 142,... \geq n \geq 13,... \Rightarrow 142 \geq n \geq 14 \Rightarrow$ تعداد $=142-14+1=\boxed{129}$ روش ۱

۲

$a_n=7n+94 \leftarrow$ روش ۲: اولین عدد: $101 \xrightarrow{+7} 108 \xrightarrow{+7} 115$ و ... و $997=$ عدد آخر ، ۱۴۹ امین $\Rightarrow \boxed{149}$ عدد داریم

(۱) (۲) (۳)

آخرین عدد سه رقمی $\rightarrow a_n=7n+94,\ a_n=a_1+(n-1)d \Rightarrow a_n=101+(n-1)7=999 \Rightarrow 7n=905 \Rightarrow \boxed{n \simeq 129}$

$a_{n+1}+a_{n+2}+a_{n+3}=a_1+nd+a_1+(n+1)d+a_1+(n+2)d \Rightarrow$

$3a_1+(3n+3)d \Rightarrow 3(a_1+(n+1)d) \Rightarrow$

$3(a_1+(n+1)d)=-6n+12 \Rightarrow a_1+(n+1)d=-2n+4 \Rightarrow$ آمدم امتحان کنم $\rightarrow n=-1 \Rightarrow$ ۳

$a_1+0=2+4=6 \Rightarrow a_1=6$

$a_{17}+a_8=2(a_1)+23d=2(6)+23(-2)=\boxed{-34}$

$a_1=6 \Rightarrow (n+1)d=-2n-2=-2(n+1) \Rightarrow (n+1)d=-2(n+1) \Rightarrow \boxed{d=-2}$

$a_{77}=a_1+76d=6+(76\times-2)=\boxed{-146}$ و $a_8=6+7d=6+(7\times-2)=\boxed{-8} \Rightarrow a_{77}+a_8=-146-8=\boxed{-154}$ جواب نهایی

۱٫۵

$a_8-a_3=a_{13}-a_8 \Rightarrow (2^{x-1})-(2^x-1)=(2^{2x}-3)-(2^{x-1}) \Rightarrow$

$2^{x-1}-2^x+2^{x-1}-2^{2x}=+1+3=+4 \Rightarrow 2^{x-1}\times 2+(-2^x-2^{2x})=+4$ ۴

$2^x=t \rightarrow (t-4)(t+1)=0 \rightarrow \boxed{x=2}$

$4=2^{x-1+1}+(-2^x)(1-2^x) \Rightarrow 4=2^x-2^x(1-2^x) \Rightarrow 4=2^x(1-(1-2^x))$, $2^x\times 2^x=2^{2x}$

$2^{2x}=4 \Rightarrow (2^2)^x=4 \Rightarrow 4^x=4 \Rightarrow \boxed{x=1}$ $S=13+8+3=24$

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$a_{13}=2^2-3=1$ و $a_8=2^0=1$ و $a_3=2^1-1=1 \Rightarrow a_{13}+a_8+a_3=1+1+1=\boxed{3}$ پاسخ نهایی

$a_{12}+a_{10}=25$ و $a_{12}-a_{10}=5 \Rightarrow a_{12}-a_{10}=2d=5 \Rightarrow d=\frac{5}{2}$

$a_{12}=a_1+11d$ و $a_{10}=a_1+9d \Rightarrow a_{12}+a_{10}=2a_1+20d=2(a_1+10d)=25 \Rightarrow$ ۵

۲

$2(a_1+10\times\frac{5}{2})=25 \Rightarrow 2a_1+50=25 \Rightarrow 2a_1=-25 \Rightarrow a_1=-\frac{25}{2} \Rightarrow$

$a_{21}=a_1+20d \Rightarrow a_{21}=-\frac{25}{2}+20\times\frac{5}{2}=-\frac{25}{2}+50=\frac{75}{2} \Rightarrow \boxed{a_{21}=37.5}$

$S_5 =$ مجموع اول
$S'_5 =$ ۵ جمله بعد $\Big\} \Rightarrow S_5 = S'_5 \times \frac{1}{3} \Rightarrow$

$S'_5 = \frac{5}{2}\big(2\underbrace{(a_6)}_{a_1+5d} + 4d\big) = \big(\frac{5}{2}(2a_1+10d)+4d\big) = \frac{5}{2}(2a_1+14d)$

$S_5 = \frac{5}{2}(2a_1+4d) \Rightarrow \frac{5}{2}(2a_1+4d) = \frac{5}{2}\times\frac{1}{3}(2a_1+14d) \Rightarrow 6a_1+12d = 2a_1+14d$

$\Rightarrow 4a_1 = 2d \Rightarrow \boxed{d = 2a_1} \Rightarrow \frac{a_2}{a_1} = \frac{a_1+d}{a_1} = 1+\frac{d}{a_1} = 1+2 = \boxed{3}$ → جواب نهایی

2

$t_n = t_n - 3d + 15 \Rightarrow -3d+15 = 0 \Rightarrow -3d = -15 \Rightarrow \boxed{d=5}$

$t_9 = t_1 + 8d \Rightarrow (t_1+\underbrace{8d}_{40})^2 = t_1^2 + 1600 + 80t_1$
$t_5 = t_1 + \underbrace{4d}_{20} \Rightarrow (t_1+20)^2 = t_1^2 + 400 + 40t_1$

$\Rightarrow t_1^2 + 1600 + 80t_1 - t_1^2 - 400 - 40t_1 = t_9^2 - t_5^2$
$\Rightarrow 1200 + 40t_1 = t_9^2 - t_5^2$

$t_7 = t_1 + \underbrace{6d}_{30} = t_1+30 \Rightarrow \frac{t_9^2 - t_5^2}{t_7} = \frac{1200+40t_1}{t_1+30} = \frac{40(30+t_1)}{(30+t_1)} = \boxed{40}$ → جواب نهایی

2

$a_1 = 2-6\sqrt{2}$
$a_{14} = 2+\sqrt{3}$ $\Big\} \Rightarrow 2+\sqrt{3} = (2-6\sqrt{2}) + 13d = a_{14} \Rightarrow$

$13d = \sqrt{3}+6\sqrt{2} \Rightarrow \boxed{d = \frac{\sqrt{3}+6\sqrt{2}}{13}}$ → روش اول

$a_{14} = a_1 + 13d \rightarrow 2-12\sqrt{3}+13d = 2+\sqrt{3} \rightarrow 13d = 13\sqrt{3} \rightarrow \boxed{d=\sqrt{3}}$

روش دوم: $d = \frac{a_{14}-a_1}{14+1} = \frac{2+\sqrt{3}-(2-6\sqrt{2})}{13} = \boxed{\frac{\sqrt{3}+6\sqrt{2}}{13}}$ → روش دوم

~~d =~~ $d = \frac{\text{جمله آخر - اولی}}{\text{تعداد واسطه} + 1}$

0

$\underbrace{2, \ldots, \ldots, \ldots}_{4n-3 \text{ واسطه}}, 32 \Rightarrow d = \frac{32-2}{(4n-3)+1} = \frac{30}{4n-2} = \frac{15}{2(2n-1)} = \boxed{\frac{15}{2n-1}}$ → قدرنسبت

$\Rightarrow \underbrace{a_{n+1}}_{\text{واسطه } n \text{ ام}} = 11 \Rightarrow a_n + d = 11 \Rightarrow \underbrace{a_{n+1}}_{11} = \underbrace{a_1}_{2} + nd \Rightarrow \boxed{nd = 9} \rightarrow d = \frac{9}{n}$

$d = \frac{32-2}{(4n-3)+1} = \frac{30}{4n-2} \Rightarrow \frac{30}{4n-2} = \frac{9}{n} \Rightarrow 30n = 36n-18 \Rightarrow 6n = 18$
$\Rightarrow \boxed{n = \frac{18}{6} = 3}$

2

$a_n + a_{n+4} = a_3 + a_{17} \Rightarrow n + (n+4) = 3+17 = 20 \Rightarrow 2n+4 = 20 \Rightarrow$
$2n = 16 \Rightarrow \boxed{n=8}$

$\Rightarrow a_8 = 3a_4 \Rightarrow \frac{a_8}{a_4} = 3 \Rightarrow \frac{a_1+7d}{a_1+3d} = 3 \Rightarrow 3a_1+9d = a_1+7d \Rightarrow$
$2a_1 = -2d \Rightarrow \boxed{a_1 = -d}$

$\Rightarrow \text{if } a_1 = -d \Rightarrow a_x = 0 \Rightarrow a_x = a_1+(x-1)d = 0 \Rightarrow a_1+xd-d = 0 \Rightarrow xd-2d = 0 \Rightarrow$
$d(x-2) = 0 \Rightarrow d \neq 0$ پس $\boxed{x=2} = \boxed{a_2 = 0}$ → جواب نهایی

2