	BCM SCHOOL, BASANT AVENUE, DUGRI, LUDHIANA CLASS-X (MATHEMATICS) ASSIGNMENT(OCTOBER,2023) TOPIC: ARITHMETIC PROGRESSION **ANSWER KEY**	
1.	**A**	**1**
2.	**B**	**1**
3.	**C**	
4.	**Given that $t_9 = 0$** **⇒ $a + 8d = 0$ or $a = -8d$ …….. (i)** **Now, $t_{29} = a + (29 - 1)d$** **$= a + 28d$** **$= -8d + 28d$ [Using (i)]** **$= 20d$ ……… (ii)** **Also, $t_{19} = a + (19 - 1)d$** **$= a + 18d$** **$= -8d + 18d$ [Using (i)]** **$= 10d$ ………. (iii)** **(ii) and (iii) ⇒ $t_{29} = 20d = 2(10d)$** **$= 2t_{19}$**	
5.	$a_m = \frac{1}{n}$ $\Rightarrow \quad a + (m-1)d = \frac{1}{n} \quad ...(i)$ $a_n = \frac{1}{m}$ $\Rightarrow \quad a + (n-1)d = \frac{1}{m} \quad ...(ii)$ $(i) - (ii) \Rightarrow$ $(m-n)d = \frac{1}{n} - \frac{1}{m}$ $(m-n)d = \frac{m-n}{mn}$ $\Rightarrow \quad d = \frac{1}{mn} \quad [\because \ m \neq n]$ $\Rightarrow \quad S_{mn} = \frac{mn}{2}\{2a + (mn-1)d\}$ $= \frac{mn}{2}\left\{2 \times \frac{1}{mn} + (mn-1)\frac{1}{mn}\right\}$ $= 1 + \left(\frac{mn-1}{2}\right) = \frac{mn+1}{2}$	

6.	Let a, d be first term & common difference of A. P. respectively. $$\frac{S_m}{S_n} = \frac{m^2}{n^2}$$ $$\Rightarrow \frac{\frac{m}{2}[2a+(m-1)d]}{\frac{n}{2}[2a+(n-1)d]} = \frac{m^2}{n^2}$$ $$\Rightarrow \frac{2a+(m-1)d}{2a+(n-1)d} = \frac{m}{n}$$ $\Rightarrow 2an + (mn - n)d = 2am + (mn - m)d$ $\Rightarrow 2a(m - n) = (m - n)d$ $\Rightarrow 2a = d$ ($\because m \neq n$) Now $\frac{a_m}{a_n} = \frac{a+(m-1)d}{a+(n-1)d} = \frac{a+(m-1)2a}{a+(n-1)2a}$ $= \frac{(2m-1)a}{(2n-1)a} = \frac{2m-1}{2n-1}$ Thus $a_m : a_n = (2m - 1) : (2n - 1)$. [Hence Proved]	
7.	**i.** Since each row is increasing by 10 seats, so it is an AP with first term a = 30, and common difference d = 10. So number of seats in 10^{th} row = $a_{10} = a + 9d$ $= 30 + 9 \times 10$ $= 120$ **ii.** $S_n = \frac{n}{2}(2a + (n-1)d)$ $1500 = \frac{n}{2}(2 \times 30 + (n-1)10)$ $3000 = 50n + 10n^2$ $n^2 + 5n - 300 = 0$ $n^2 + 20n - 15n - 300 = 0$ $(n + 20)(n - 15) = 0$ Rejecting the negative value, n = 15 **OR** No. of seats already put up to the 10^{th} row = S_{10} $S_{10} = \frac{10}{2}\{2 \times 30 + (10-1)10\}$ $= 5(60 + 90)$ $= 750$ So, the number of seats still required to be put is 1500 – 750 = 750 **iii.** If no. of rows = 17 Then the middle row is the 9^{th} row $a_8 = a + 8d$ $= 30 + 80$ = 110 seats	**4**