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1) Total no. of individuals in genotypes AA, AB, BB are 1, 500, 750 respectively.

total populations = 1251

Let frequency of A = p

" " B = q

Population having genotype AA = p^2 = 1

" " " AB = 2pq = 500

" " " BB = q^2 = 750

So, $p = \frac{1 + \frac{1}{2} \times 500}{1 + 500 + 750} = \frac{251}{1251} = 0.2006$

$q = 1 - p = 0.7994$

expected ~~population~~ proportion of AA = $p^2 = (0.2006)^2$

$= 0.04024036 = 0.04024$

" " of AB = $2pq = 2 \times 0.2006 \times 0.7994$

$= 0.32072$

" B = $q^2 = (0.7994)^2 = 0.63904$

expected population = expected proportion x total population.

∴ Expected population of AA = $p^2n = 0.04024 \times 1251$

$= 50.36$

expected population of AB = $2pqn = 0.32072 \times 1251$

$= 401.28$

" B = $2q^2 = 0.63904 \times 1251$

$= 799.36$

	p^2	$2pq$	q^2
O	1	589	757
E	50.26	401.28	771.36
$(O-E)^2$	2426.41	9745.64	2426.41
$\frac{(O-E)^2}{E}$	48.28	24.286	3.048

$$\chi^2 = \sum_{i=1}^{n} \frac{(O-E)^2}{E} = 48.28 + 24.286 + 3.048$$

$$= 75.714$$

DOF for 3 genotypes $= 2$

& $\alpha = 0.05$

As for H-W equilibrium, the required χ^2 is 5.99.

but we got $\chi^2 = 75.714 >> 5.99$.

∴ The population is not in HW equilibrium.