

# Solution of question xl-65.2023

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Question: The frequencies for autosomal alleles  $A$  and  $a$  are  $p = 0.5$  and  $q = 0.5$ , respectively, where  $A$  is dominant over  $a$ . Under the assumption of random mating, the mating frequency among dominant parents is.

**Solution:** Given:  $A$  and  $a$  are two alleles where  $A$  is dominant one.

Parameter	Value	Description
$n$	2	number of Alleles
$p$	0.5	frequency of dominant one
$q$	0.5	frequency of recessive one
$Y$	0,1,2	Number of dominant allele in zygote

Using binomial which states that

$$\Pr(Y = i) = {}^nC_i(p)^i(q)^{(n-i)} \quad (1)$$

For the mating frequency among the dominant parents, both parents must have atleast one dominant allele. The probability of getting atleast 1 dominant allele in parent zygote :

$$\Pr(Y \geq 1) = \Pr(Y = 1) + \Pr(Y = 2) \quad (2)$$

$$= {}^2C_1(p)(q) + {}^2C_2(p)^2(1) \quad (3)$$

$$= 2pq + p^2 \quad (4)$$

$$= 0.5 + 0.25 \quad (5)$$

$$= 0.75 \quad (6)$$

