

1. The frequency of two alleles in a gene pool is 0.1 (A) and 0.9 (a).

What percent of the population is heterozygous (Aa), assuming a Hardy Weinberg equilibrium? _____

What percent of the population is homozygous (aa), assuming a Hardy Weinberg equilibrium? _____

What percent of the population is homozygous (AA), assuming a Hardy Weinberg equilibrium? _____

2. The allele (B) for white wool is dominant over the allele (b), for black wool. In a sample of 900 sheep, 891 sheep are white and 9 are black.

What percent of the population is heterozygous (Bb), assuming a Hardy Weinberg equilibrium? _____

What percent of the population is homozygous (bb), assuming a Hardy Weinberg equilibrium? _____

What percent of the population is homozygous (BB), assuming a Hardy Weinberg equilibrium? _____

3. In a population that is in a Hardy-Weinberg equilibrium, the frequency of the recessive homozygous genotype is 0.09.

What is the percentage of individuals in the population that are homozygous dominant in genotype? _____

4. In a population that is in Hardy-Weinberg equilibrium, 36% of the individuals are recessive homozygotes for a certain trait.

For the same trait, what is the percentage of homozygous dominant individuals in the population? _____

For the same trait, what is the percentage of heterozygous individuals in the population? _____

5. The allele (T), for the ability to taste a particular chemical, is dominant over the allele (t), for the inability to taste the chemical PTC. At Cornell University, out of 400 surveyed students, 64 were found to be nontasters. Please assume the population is in a Hardy Weinberg equilibrium.

What percent of the student population is heterozygous (Tt)? _____

6. Among humans, Rh positive blood is produced by the expression of the dominant gene (R), while Rh negative blood is produced by the expression of the recessive gene (r).
In a population that is in a Hardy Weinberg equilibrium, if 84% of the individuals are Rh positive, what are the frequencies of the following.....

R _____

r _____

7. In field corn, yellow kernel color is governed by a dominant allele; white, by the recessive allele. A random sample of 1,000 kernels from a population that is in a Hardy Weinberg equilibrium reveals that 910 are yellow and 90 are white.

What is the frequency of the white allele in the population? _____

What is the frequency of the yellow allele in the population? _____

What percent of the population is heterozygous? _____

8. A rare fatal disease, which is produced by the expression of a rare recessive allele, occurs with a frequency of one in a million.

How many individuals, in a town of 14,000, can be expected to carry this recessive lethal allele? _____

9. Two pirates and three Polynesian beauties settled on an uninhabited island. All five had brown eyes, but one man carried the recessive allele for blue eyes (Bb).

What was the initial frequency of the (B) allele on the island? _____

What was the initial frequency of the (b) allele on the island? _____

If you assume a Hardy Weinberg equilibrium for the eye color alleles (admittedly very improbable), how many people would you expect to have.....

Blue eyes when the island population reaches 20,000? _____

If the number of blue eyed individuals differs greatly from your prediction then what factors could account for the difference between what you predicted and what you observed?

1. _____

2. _____

3. _____

4. _____

5. _____

10. In a population that is in Hardy Weinberg equilibrium, if the frequency of the (A) allele is 0.75 and the frequency of the (a) allele is 0.60, then the sum of P and q will be.

- a.) 1.35
- b.) 0.65
- c.) 0.40
- d.) 0.25
- e.) These frequencies cannot exist in the population described.

11. In a population in Hardy Weinberg equilibrium, if the genotypic frequencies are 81% AA, 18% Aa, and 1% aa, what are the frequencies of the (A) and (a) alleles, respectively?
- 0.81 & 0.01
 - 0.18 & 0.18
 - 0.9 & 0.1
 - 0.09 & 0.01
 - 0.01 & 0.09
12. Tay Sachs disease is inherited as a recessive trait and occurs in Ashkenazic Jews at a frequency of 1 per 3,600 births. What would be the estimated percentage of this population that are carriers of the Tay Sachs allele?
- 3.3%
 - 1.7%
 - 0.983%
 - 0.06%
 - 0.033%
13. For a population in Hardy Weinberg equilibrium, all of the terms of the generalizations can be calculation by knowing the value of any on of several items. The remaining terms in the equation CANNOT be determined if the value of _____ is the only term known.
- P
 - q
 - P^2
 - $2Pq$
 - q^2
14. In a population in Hardy Weinberg equilibrium, there are two alleles, (A) and (a), for a particular locus. If the frequency of the (a) allele is 0.4, what is the frequency of the genotype (AA)?
- 0.16
 - 0.36
 - 0.40
 - 0.48
 - 0.60
15. In a population at Hardy Weinberg equilibrium, the frequency of the dominant phenotype is represented by.....
- p^2
 - $P^2 + 2Pq$
 - either P or q
 - $P + q$
 - $2Pq + q^2$
16. In a population at Hardy Weinberg equilibrium, what proportion of individuals are heterozygous for the (a) allele if its frequency is 0.01?
- 0.001
 - 0.01
 - 0.02
 - 0.10
 - 0.20
17. Phenylketonuria is a disease in which the affected individuals lack an enzyme required for the metabolism of the amino acid phenylalanine. It is inherited as a Mendelian recessive and appears at the rate of one in every 15,000 births in the United States. What percentage of this population is homozygous normal at the locus where PKU occurs?
- 0.067%
 - 2.58%
 - 5.02%
 - 94.9%
 - 98.4%

18. A recent study has shown the 9.0% of the natives on the South Pacific island of Pago Fuago possess an allergic reaction to coconuts. This reaction, which appears to be an immune response similar to hives, is thought to be due to the expression of a recessive gene (h). The population of this tropical paradise is 5000 and is in a Hardy Weinberg equilibrium. With respect to this population.....

a.) _____ is the frequency of the (H) gene.

b.) _____ is the frequency of the (h) gene.

c.) _____ is the total number of (h) genes on Pago Fuago.

d.) _____ is the total number of (H) genes on on Pago Fuago.

e.) _____ is the total number of homozygous non-allergic Pago Fuagens

f.) _____ is the total number of Pago Fuagens that carry the (h) allele and are phenotypically normal

g.) _____ is the total number of Pago Fuagens that suffer the irritating immune response and are forced to watch as other tribe members frolic at monthly coconut luaus.