

Population Genetics Homework

1. The genotypic frequency of AA is D , for Aa is H , and for aa is R . How is the allelic frequency of a obtained?
 - a. $D + H/2$
 - b. $D + R$
 - c. Square root D
 - d. $R + H/2$
 - e. $H + R/2$
2. In a certain herd of cattle 20 have red coat (RR), 30 are roan (Rr), and 50 are white (rr). What is the frequency of the R Allele?
 - a. .35
 - b. .5
 - c. .65
 - d. .7
 - e. .8
3. If in a large population in Hardy-Weinberg equilibrium a dominant allele occurs with a frequency of 64%, then, after 10 generations, the frequency of the dominant allele would be expected to:
 - a. Decrease to 50%
 - b. Increase to 80%
 - c. Increase to 100%
 - d. Remain unchanged
4. A population of wild rats obeying the Hardy-Weinberg equilibrium with respect to coat color would be expected to:
 - a. Increase the proportion of dominant phenotypes
 - b. Increase the proportion of heterozygotes
 - c. Increase the proportion of homozygous recessives
 - d. Maintain a constant proportion of dominant to recessive alleles
 - e. Eliminate heterozygosity
5. What will be the proportions of the zygotes in the next generation, which is in Hardy-Weinberg equilibrium, if the initial population is .10 AA , .60 Aa , and .30 aa ?
 - a. .01 AA , .18 Aa , .81 aa
 - b. .25 AA , .50 Aa , .25 aa
 - c. .36 AA , .48 Aa , .16 aa
 - d. .09 AA , .42 Aa , .49 aa
 - e. .16 AA , .48 Aa , .36 aa
6. In a herd of cattle, RR is red coat, Rr roan, and rr white, what is the genotypic frequency of Rr if the allelic frequency of R is .2?
 - a. .16
 - b. .2
 - c. .32
 - d. .4
 - e. .64
 - f. .8

7. In an African tribe speaking the Bantu-type language, the frequency of individuals suffering from sickle cell anemia varies from 2 to 45%. Assume a tribe where the severe sickle cell condition SS appears in a frequency of 36%. What is the frequency of those with normal blood cells?
8. In a population of plants, RR is the red flowers, Rr pink and rr white. What would be the phenotypic frequency of pink flowered plants if the allelic frequency of $r = .7$.
- .09
 - .3
 - .42
 - .49
 - .7
9. Left-handedness is recessive to right-handedness. If 9% of a sample population are left handed, what is the probable frequency of the allele for this trait in the total population?
- .0081
 - .09
 - .3
 - .8281
 - .91
10. If, in a sample of people in Birmingham, England, 49% were found to be of blood group NN , what would be the expected frequency of the MM group (M is the other allele, MN is heterozygote)?
- .09
 - .03
 - .42
 - .49
 - .51
 - .7
11. In human, about one man in 25 is color-blind, color blindness being a sex linked recessive. What proportion of women would be expected to be color-blind?
- 24/25
 - 1/25
 - 1/625
 - 1/5
 - 4/5
12. Genetic drift is most apt to occur in:
- Populations with high mutation rates
 - Marine habitats
 - High elevations
 - Small populations
 - Large populations

13. In a random flock of chickens, 40% of the females are slow feathering, which is caused by the sex linked recessive allele, k . What proportion of males in this flock is fast feathering?
- .37
 - .40
 - .60
 - .63
 - .84
14. In a large population, the a allele has a frequency of .40, while in a near-by adjoining smaller community, the frequency is .10. Migrants totaling twenty percent of the smaller community enter from the large population. After one generation of random mating what is the frequency of the heterozygotes in small population?
- .0256
 - .1600
 - .2688
 - .7056
 - .8400
15. Among 1000 Egyptians tested for the ability to taste phenylthio carbamide (PTC), 840 were found. If the allele for tasting is dominant over nontasting allele, what proportion of matings will be of the type *nontaster* X *taster*?
- .0256
 - .1344
 - .2688
 - .7056
 - .84
16. A mink rancher has a randomly breeding population and prevents those animals that show a barred fur pattern (due to recessive bb) from mating. The barred animals are 16% of his population. What is the reduction of allelic frequency of b from the second to the third selected generation?
- .01
 - .02
 - .04
 - .06
 - .08
17. Do dominant alleles spread more rapidly in a population than recessive alleles do?