

Quantitative Genetics

1. What is a trait called which is affected by one pair of alleles so that the phenotypes can be easily placed into specific classes?
 - a. Continuous
 - b. Quantitative
 - c. Qualitative
 - d. Polygenic
 - e. Additive

2. What is a continuously measured trait influenced by polygenes and the environment called?
 - a. Quantitative
 - b. Qualitative
 - c. Discontinuous
 - d. Mendelian

3. Define mean.
 - a. Addition of all measurements divided by the number of measurements
 - b. Sum of deviations squared
 - c. Sum of all measurements
 - d. Sum of squares divided by the number of observations

4. Choose the best definition of a threshold trait:
 - a. Affected by several genes and the environment
 - b. Provides different degrees of expression when the trait appears in the phenotype
 - c. An all-or-none trait influenced by several genes and the environment
 - d. An all-or-none trait with 100% incidence

5. Define variance.
 - a. Sum of squares of the deviations from the mean divided by degrees of freedom
 - b. Sum of squares divided by degrees of freedom
 - c. Sum of the observations divided by the number of observations
 - d. Sum of deviations from the mean divided by number of observations minus one

6. The variance of a population is 16. What is the standard deviation?
 - a. 2
 - b. 4
 - c. 16
 - d. 32
 - e. 256

7. Define heritability
 - a. The additive genetic value divided by the phenotypic value
 - b. Non-additive genetic variance divided by the phenotypic variance
 - c. Ratio of additive plus non-additive genetic variance to total variance
 - d. The additive genetic variance divided by the total variance

8. What circumstances cause a low heritability?
 - a. Environmental variance is large, additive variance is small
 - b. Environmental variance is small, additive variance is large

- c. Environmental variance and additive variance are the same
 - d. Phenotypic variance is equal to additive variance
9. In a dairy herd the combined dominance variance for milk production was 200, the environmental variance was 49,800 and the phenotypic variance 55,000. What is the heritability?
10. A farmer measures the number of pounds of weight gained by each of 5 pigs over a 20-day period. The values he obtains are? 15, 20, 25, 30, 40. What is the variance of weight gain?
- a. 74.0
 - b. 92.5
 - c. 122.3
 - d. 185.0
 - e. 370.0
11. The standard deviation of 12-week body weight of chickens was 70 in a specific flock. The heritability was 0.20. What was the additive genetic variance?
- a. 14
 - b. 70
 - c. 980
 - d. 1960
 - e. 4900
12. There is a delayed feathering gene in chickens k^n phenotypically recessive to K^n . The comb weights in grams were determined for each of the three genotypes as follows: K^nK^n .0469; K^nk^n .4239; k^nk^n .468. What are the a and d values for comb weight at this locus?