Quiz: Traits and Probability

Read each question. Circle the letter of the correct answer.

1. Which example is not an outcome of the environment modifying a phenotype?

A. the changing of the color of an animal's fur as the temperature changes

B. the increased intelligence of a person who attended school for many years

C. the pink-flowered snapdragons that result from crosses between red-flowered and white-flowered snapdragon plants

D. the very short stature of a kind of tree that grows at a high altitude in comparison with the same kind of tree growing at a lower altitude

2. What is the phenotypic ratio of a monohybrid cross between two heterozygous parents?

A. 3:1

B. 1:2:1

C. 9:3:3:1

D. 1:2:2:1

3. What is the name for a cross that examines the inheritance of two traits?

A. dihybrid

B. monohybrid

C. codominance

D. incomplete dominance

4. In pea plants, the color yellow (*Y*) is dominant to green (*y*) and having round pea pods (*R*) is dominant to having wrinkled pea pods (*r*). What fraction of offspring would have green, wrinkled pea pods if both parents had the genotype *YyRr*?

A. 0/16

B. 1/16

C. 4/16

D. 8/16

5. What is the probability that the offspring of a cross between a homozygous recessive parent and a heterozygous parent will be homozygous recessive?

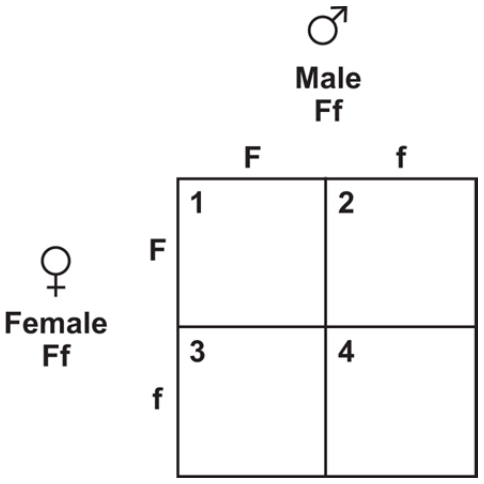
A. 1/1

B. 1/2

C. 1/4

D. 1/8

6. In humans, having freckles (F) is dominant to not having freckles (f). The inheritance of these traits can be studied using a Punnett square as shown.



Which box in the Punnett square represents a child who does not have freckles?

A. box 1

B. box 2

C. box 3

D. box 4

7. The ability to taste the chemical PTC is due to a single gene in humans. Tasters carry the dominant allele *T* and nontasters carry the recessive allele *t*. Imagine two heterozygotes have a large family. The phenotypic ratio for tasters:nontasters in their children is _____.

A. 1:1

B. 3:1

C. 1:2:1

D. 9:3:3:1

8. Which of these will complete the analogy female: XX: : _____?

A. male: XY

B. male: YY

C. female: eggs

D. female: gametes

9. In the case of codominant alleles, a plant that is homozygous for red flowers that is crossed with a plant that is homozygous for white flowers will produce flowers that are _____.

A. pink and red

B. completely white

C. dark pink all over

D. red and white spotted

10. Two parents have the genotype *Gg* for a genetic disorder caused by a dominant allele. What is the chance that any of their children will inherit the disorder?

A. 25%

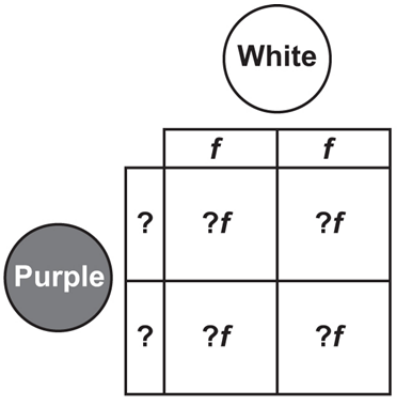
B. 50%

C. 75%

D. 100%

Read each statement. Write your answer on the lines.

11. A Punnett square with information about the offspring is shown.

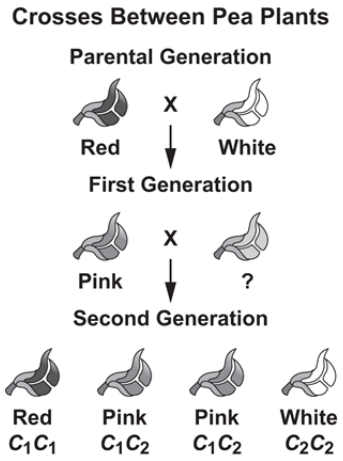


Half of the offspring are purple and half of the offspring are white.

Use the Punnett square and given information to predict the genotype for the parent organism whose genotype is unknown, and explain why it is the predicted genotype.

12. The diagram shows crosses between pea plants.

Write the genotypes of the pea plants in the parental generation shown in the diagram. Use the genotypes of the parents to describe a Punnett square for the first generation of offspring.



13. What are three ways to express the probability of an event that occurs 500 times out of 2,000 total trials?

14. In humans, colorblindness is a recessive, sex-linked trait. What is the likelihood that the children of a woman heterozygous for colorblindness and a man with normal color vision will be colorblind? Explain the answer.

15. All of the offspring resulting from a cross between a red snapdragon and a white snapdragon are pink. What is the possible explanation for this? Explain.