Name:_____ Period:_____ Date:_____

AP Genetics Worksheet 2

1. The genes for dark eyes (black and brown) usually dominate over genes for blue or gray eyes. A man with black eyes marries a woman with light gray eyes. They They have two children, a boy with black eyes, and a girl with blue eyes. What are the genotypes of the man, his wife, the little boy, and the little girl?

2. A man and a woman have 24 children. Of the children, 17 have brown eyes and 7 of the children have blue eyes. What are the genotypes of the parents?

3. Assume that a cross was made between fruit flies of genotype AAbb and those of genotype aaBB. Give the expected phenotypic ratio for the F_2 generation.

4. In sesame plants, the one-pod condition (P) is dominant to the three-pod condition (p), and normal leaf (L) is dominant to wrinkled leaf (l). These traits are inherited independently. Determine the genotypes for the two parents for all the possible matings producing the following offspring:
    a. 318 one-pod normal, 98 one-pod wrinkled

    b. 323 three-pod normal, 106 three-pod wrinkled

    c. 401 one-pod normal

    d. 150 one-pod normal, 147 one-pod wrinkled, 51 three-pod normal, 48 three-pod wrinkled

    e. 223 one-pod normal, 72 one-pod wrinkled, 76 three-pod normal, 27 three-pod wrinkled

5. Two traits are simultaneously examined in a cross of two pure-breeding pea-plant varieties. Pod shape can be either swollen or pinched. Seed color can be either green or yellow. A plant with the traits swollen, green is crossed with a plant with the traits pinched, yellow, and a resulting F1 plant is self-crossed. A total of 640 F2 progeny are phenotypically categorized as follows:
    a. Swollen, yellow – 360
    b. Swollen, green – 120
    c. Pinched, yellow – 120
    d. Pinched, green – 40

-What is the phenotypic ratio observed for pod shape? Seed color?

-What is the phenotypic ratio observed for both traits considered together?

-What is the dominance relationship for pod shape? Seed color?

6. A student has a penny, nickel, dime, and a quarter. She flips them all simultaneously and checks for heads or tails.

- What is the probability that all four coins will come up heads?

- She flips them all simultaneously and checks for heads or tails. What is the probability that all four coins will be heads on both tosses?

- What probability rule did you use to determine your answers?

6. Phenylketonuria (PKU) is an inherited disease determined by a recessive allele. If a woman and her husband are both carriers, what is the probability of each of the following?
    a. All three of their children will be normal.

    b. One or more of the three children will have the disease

    c. All three children will be afflicted with the disease

7. The genotype of F1 individuals in a tetrahybrid cross is AaBbCcDd. Assuming independent assortment of these four genes, what are the probabilities that F2 offspring would have the following genotypes?
    a. aabbccdd
    b. AaBbCcDd
    c. AABBCCDD
    d. AaBbccDd
    e. AaBBCCdd

8. Assume that blood type is inherited as A and B dominant over O, but A and B incompletely dominate over each other. Genotypes AA and AO are then phenotypically type A, genotypes BB and BO are type B, genotype AB is type AB, and genotype OO is type O blood. A man with type A blood marries a woman with type A blood. They have the first child as blood type O. What are the genotypes of both parents and the child.

9. A man with type AB blood marries a woman with type O blood, but whose father was type A blood. What genotype would you expect their first child to have? Why?

10. When shorthorn red cattle are bred to shorthorn white cattle, they produce roan (red and white hairs interspersed) offspring. What type of inheritance is this?
    (a) If two roan shorthorns are crossed, what is the probability of red, white and roan colors in their offspring?

11. In andalusian fowl, F^B is the gene for black plumage. F^b is the gene for white plumage. These genes show incomplete dominance. The heterozygous condition results in blue plumage. List the genotypic and phenotypic ratios expected from the crosses:
(a) black X blue
(b) blue X blue
(c) blue X white