Heredity Practice 3

**Respond to these problems on a separate sheet of paper. Clearly number each question. Show all work. Ignoring these directions will result in a zero.**

1. Red-green colorblindness is an x-linked recessive disorder. A man who is not red-green colorblind marries a woman who is a carrier of red-green colorblindness. The man and the woman both have type AB blood.

A) What are the chances that their first child will be a female carrier of red-green colorblindness?

B) What are the chances that their first child will have type A blood?

C) What are the chances that their first child will be a red-green colorblind male with type AB blood?
2. In fruit flies, sex chromosomes work exactly the same way that human sex chromosomes do. Having white eyes is a recessive x-linked trait in fruit flies; the dominant phenotype is red eyes. Body color is not x-linked; a brown body is dominant and a yellow body is recessive. A white-eyed male who is heterozygous for body color mates with a yellow female who is heterozygous for eye color.
3. What are the genotypes of these two flies?
4. What percentage of the F1 will be yellow?
5. What percentage of the F1 will be red-eyed males?
6. What percentage of the F1 will be brown females?
7. In humans, being immune to poison ivy is a dominant phenotype while being susceptible to poison ivy is a recessive phenotype (this is complete dominance). A man who is susceptible to poison ivy and who has the blood genotype AO marries a woman who is heterozygous for poison ivy sensitivity and who has type O blood.
8. Find the genotypic ratio of their offspring.
9. Find the phenotypic ratio of their offspring.
10. In cats, crossing a black cat with a tan cat results in a phenotype called “tabby:” black and tan striped.
A) Is this codominance or incomplete dominance? How can you tell?

B) Find the genotypic ratio of the offspring of two tabby cats.

C) Suppose the two tabby cats from part B have a litter of 8 kittens. How many kittens would you expect to be black?
11. In a fictional species of rabbit, fur color is controlled by a single gene and there are three different fur colors: black, white, and gray. To determine which color is dominant, you cross a black rabbit with a white rabbit. All of the F1 are gray.
A) Is this codominance or incomplete dominance? How can you tell?

B) What is the genotype of the F1?

C) You summarize your findings to a friend of yours, who claims that the traits in offspring are always just a “mix” of the parents’ traits. What could you do to convince your friend that this is not how inheritance works?