BIO102 Homework

Use the back of the page as needed.

1. Fill in the phenotype. Bobtails in rabbits is recessive (long tails dominant)
   TT ______________________ Tt ______________________    tt ______________________

2. In guinea pigs, the allele for short hair is dominant. Fill in the genotype of heterozygous short haired guinea pig _____ of long haired guinea pig ______

3. A man is heterozygous for brown eyes
   a. What is his genotype (use symbols)?
   b. What 2 types of gametes (sperm) can he produce with respect to the gene for eye color?
   c. What percentage of the sperm will carry an allele for blue eyes?

4. Albinism (lack of fur pigment) is a recessive trait. Albino raccoons are white, genotype aa. A heterozygous female is mated to a male who also has heterozygous genotype. Show work for full credit.
   a) show the mating cross
   b) show the phenotype of the female and male parents
   c) what is the chance of an albino raccoon in the offspring?

4. A woman has sickle cell disease. The sickle cell allele is recessive to the normal allele. She has a child with a man who is homozygous dominant. Show your work for full credit.
   a) show the allele key
   b) show the mating cross
   c) what is the chance of a child with sickle cell disease?

5. The allele for brown fur in cats is recessive to the dominant allele for black fur. Is it possible for 2 black cats to have a brown kitten? Is it possible for 2 brown cats to have a black kitten? Explain.

6. Polydactyly (more than 5 fingers on a hand) in humans is determined by a dominant allele. A normal woman whose mother had polydactyly is pregnant. Her husband has polydactyly but his mother did not. The woman is concerned that her child will be born with extra fingers and toes, especially since the child they already have has the condition. What is the chance that the next child will exhibit polydactyly? Show your work for full credit.

7. A man of blood type AB (I^A I^B) has a child with a woman of blood type A (I^A i). What different blood groups could the child exhibit? Show your work for full credit.

8. In dogs, black fur is dominant over brown. Spotting is dominant over non-spotting. A female dog is heterozygous for coat color and spotting. She is mated to a male with brown fur and no spots. Show your work for full credit.
   a) What are the names of the 2 genes?
   b) Show the allele key (there are 4 alleles to consider in a 2 gene cross)
   c) List the types of gametes each dog can produce (each gamete contains one of each gene’s alleles)
   d) Show the cross of the parent dogs
   e) What are the expected ratio of offspring genotypes and phenotypes in the puppies? (you may have a 16 box Punnett square)