Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_\_\_

**Heredity Practice #2**

1. II.2 and II.3 are planning to have children. II.1 passed away from cystic fibrosis, a recessive genetic disorder, when he was a young child. Neither I.1 nor I.2 had CF. I.4 was a carrier of cystic fibrosis and that his mother was not a carrier and did not have CF.   
   A) What is the probability that both II.2 and II.3 are carriers of CF? **¼ or 25%**  
   **Explanation:**

**You know that I.1 and I. 2 are both heterozygous because they do not have CF and they had one son with CF. The probability of two heterozygotes producing a child with CF is 50%, so the odds of II.2 being a carrier is 50%.  
  
It’s given that I.3 is homozygous dominant and it is given that I.4 is heterozygous. The probability of a homozygous dominant and a heterozygous individual having a child who is a carrier is 50%. The odds of II.3 being a carrier is therefore also 50%.**

**Multiply these probabilities together: ½ x ½ = ¼**

B) What is the probability II.4 is not a carrier of CF? **½--see the second part of the explanation for 1A if you’re not sure how this works.**  
  
C) If both II.2 and II.3 are carriers, what is the probability that their first child will not be a carrier of CF? **¼ (just a Punnett Sq with two heterozygous parents)**

1. Robert and Christina have 2 daughters and 1 son. Robert’s parents have 1 daughter in addition to their son Robert. Christina’s parents have three sons in addition to their daughter Christina. Draw a pedigree of this family in the space below.
2. Use the pedigree from #2 for these questions:  
   A) Albinism (being albino) is a recessive disorder. Neither Robert nor Christina is albino. Robert and Christina’s oldest daughter is albino. Robert’s father is albino. Robert’s mother is homozygous dominant for albinism. Christina’s father is homozygous dominant for albinism. Use this information to shade in your pedigree appropriately.  
     
   B) Provide genotypes for the following individuals:  
   Robert: \_\_\_**Aa**\_\_\_\_\_\_ Christina: \_\_**Aa**\_\_\_\_\_\_\_  
   Robert’s sister: \_\_\_\_**Aa**\_\_\_\_\_ Christina’s mother: \_\_\_\_**Aa**\_\_\_\_  
   Robert’s father: \_\_\_**aa**\_\_\_\_\_ Christina’s father: \_\_\_\_\_\_**AA**\_\_\_  
   C) What is the probability that Robert and Christina’s next child will be both male and albino?  
   **Probability of male = ½**   
     
   **Probability of albino = ¼ (Punnet Sq between two heterozygotes…)  
     
   Probability of male and albino = ½ x ¼ = 1/8**
3. Use the pedigree below to answer the questions. This pedigree shows the inheritance of a trait called brachydactyly, which means that an individual’s fingers and toes are unusually short.   
     
   A) Is brachydactyly dominant or recessive? How can you tell?  
   Recessive: Two unaffected individuals (I.3 and I.4) had an affected child (II.4).  
     
   B) Provide genotypes for the following individuals. For some individuals there may be two possible genotypes.  
   I. 3 \_\_\_**Bb**\_\_\_\_\_ I. 4 \_\_\_**Bb**\_\_\_\_ II.1 \_\_\_**Bb**\_\_\_\_\_ II.2 \_\_\_**Bb**\_\_\_\_\_ II.3 \_\_\_**Bb**\_\_\_\_\_ III.3 \_\_\_**bb**\_\_\_\_\_  
     
   C) If III.2 is heterozygous for brachydactyly, what is the probability that her first child with III.3 will have brachydactyly?  
   **½: This is just a Punnet Sq between a homozygous recessive individual and a heterozygote.**