

Names: \_\_\_\_\_ **30 Points**

### **Genetic Problems**

***Write the FINAL ANSWERS below each question. Show all work on the back.***

1. a. The ability to taste a bitter chemical, phenylthiocarbamide (PTC), is due to a dominant allele (T). In terms of tasting ability, what are the possible phenotypes of a man both of whose parents are tasters?  
  
b. What are the possible genotypes?
  
2. a. If the man in #1 marries a woman who is a non-taster, what proportion of their children could be tasters?  
  
b. Suppose one of the children is a non-taster. What would you know about the father's genotype?
  
3. What is the probability of drawing two aces out of a deck of 52 playing cards, one the ace of hearts and the other the ace of spades?
  
4. You have just flipped a coin five times and it has turned up heads every time. What is the chance that the next time you flip it, it will turn up tails?
  
5. a. PKU, phenylketonuria, is a disease caused by the presence of two recessive alleles of a particular gene. Individuals who are homozygous for the dominant allele of that gene or who are heterozygous show no signs of the disease. If two healthy parents have a child with PKU, what are their genotypes with respect to PKU?  
  
b. What are their chances of having another child with the same disease?
  
6. A single normal-appearing fruit fly is crossed with a black fruit fly having vestigial wings. If 83 of the resulting offspring are normal, and 96 are black but have normal (long) wings, what is the genotype of the normal parent?
  
7. A cleft (dimpled) chin is a dominant trait. A man with a cleft chin has a brother with a smooth chin. Both his parents have cleft chins. If the man marries a woman with a smooth chin, what is the likelihood that their first child will have a cleft chin?