



# Eroh's AP Bio Pedigree Challenge Problems

Many of these problems have been adapted from the work of [Stephen T. Abedon](#) – Ohio State University

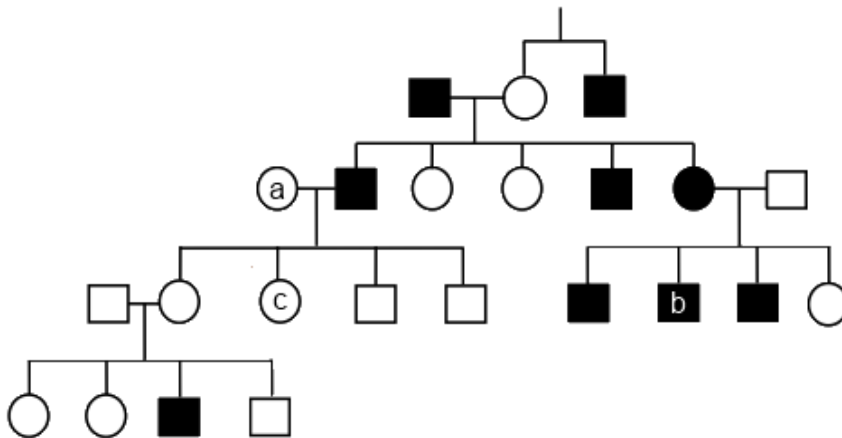
**Practice questions** (Use the letter B / b for the alleles of the following 5 punnet squares)

 Fully affected    
  Unaffected    
  Partially affected    
  Fully affected at night only

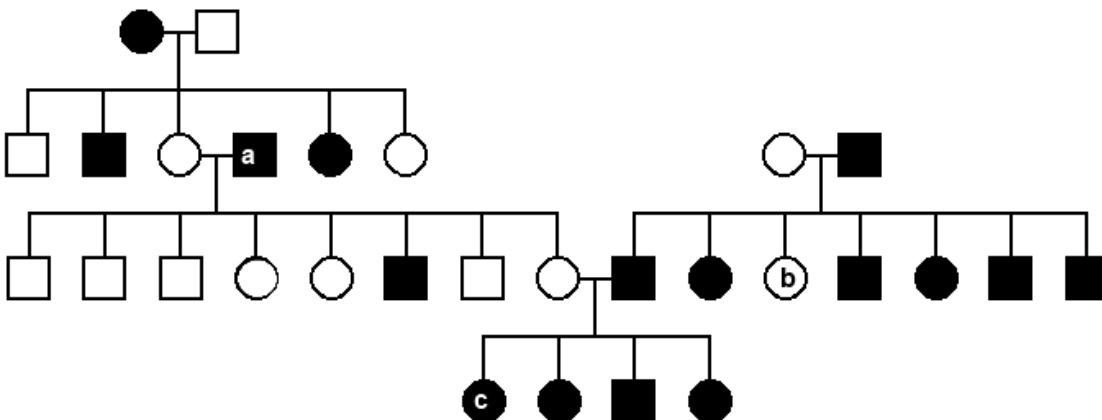
Do the following for these two punnet squares

- For each of the following pedigrees answer the following: What describes the type of inheritance in the following pedigree with the highest probability?
- What is the genotype of individuals A, B and C?
- Each one has one or more regions that do not match the probabilities you would predict. Circle that region and state why it is statistically improbable

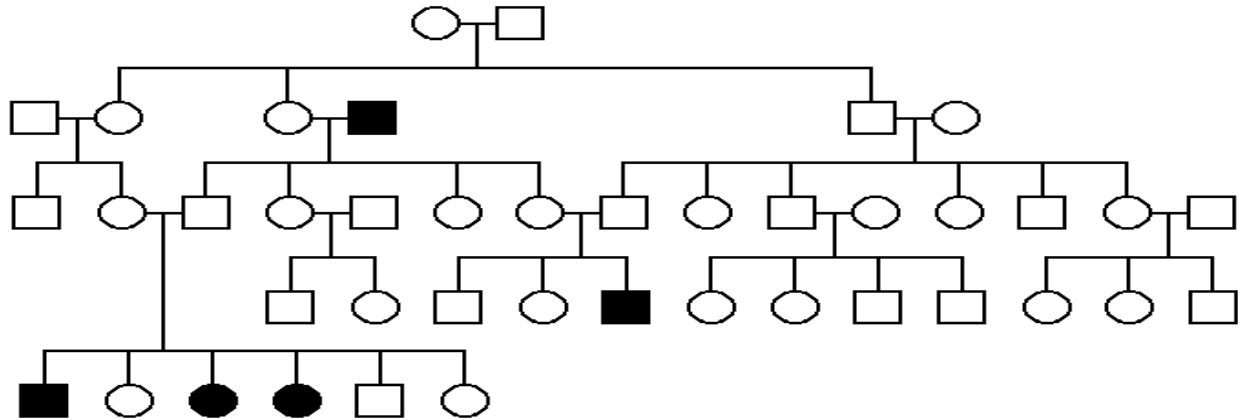
A.



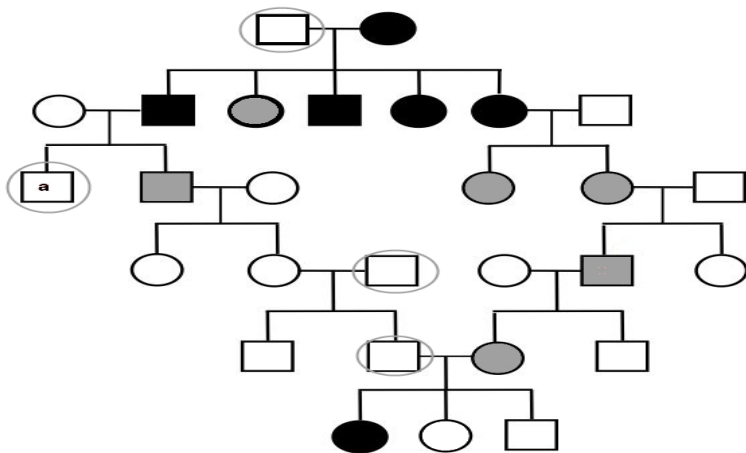
B.



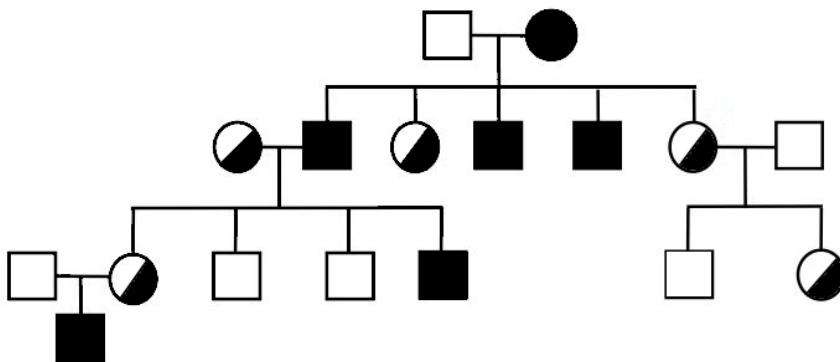
- C. For the following 3 pedigrees, write the genotypes of **all persons** whose genotypes can be **absolutely determined**. If you cannot determine the genotype, leave them blank.



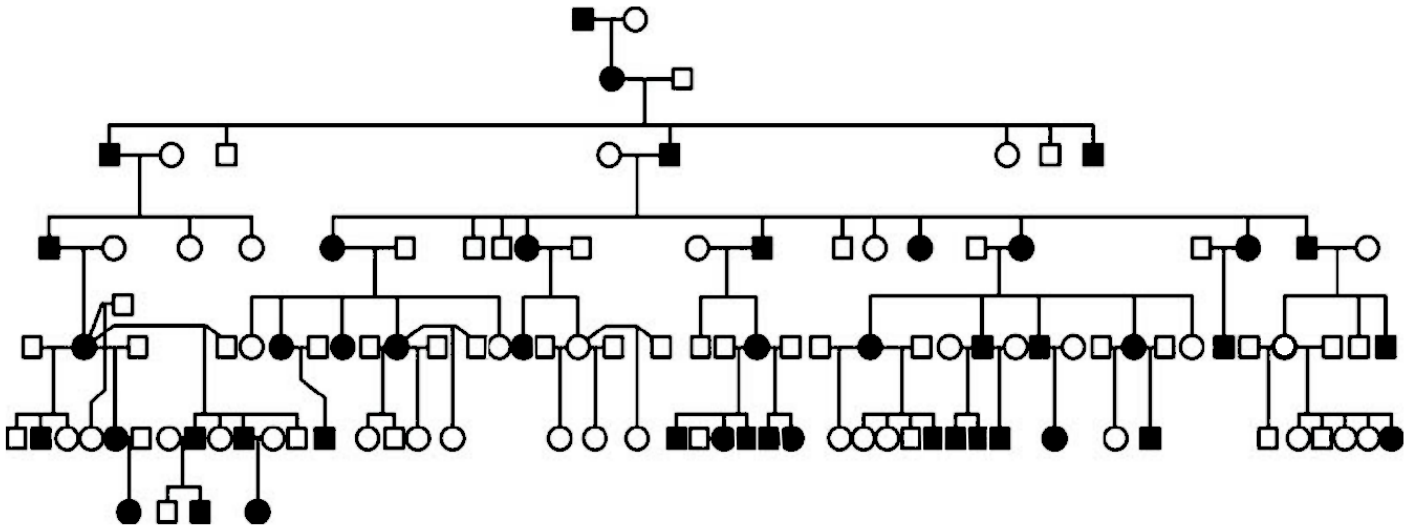
- D. Determine the method of inheritance. The circled individuals are not colored to match their phenotype. Color them in the way they would need to be to complete the pedigree.



- E. Determine the method of inheritance.



- F. For this pedigree you need to determine the method of inheritance, you do not need to label the genotype of any individuals. In addition, you need to find the one spot on the pedigree with an error (where the inheritance pattern is impossible)



- G. Suppose that the recessive allele of an X-linked gene is lethal (expressing the recessive allele causes metabolic disorders that result in a miscarriage of that offspring). A man marries a woman who is heterozygous for this gene. If this couple had a large number of normal children, what would be the predicted sex ratio of these children (ratio of male children to female children)? (adapted from J.L. Gould and W.T. Keeton (1996). *Biological Science*. Sixth Edition. W.W. Norton & Company. New York. P. 443) [\[PEEK\]](#)

- H. On your first day interning in the office of a human geneticist, a man with purple ears walks in. You questioned the man and wrote down the following family history.
- The man's mother and one of his sisters also had purple ears, but his father, his brother, and two other sisters had normal ears. The man and his normal-eared wife had seven children, including four boys and three girls. Two girls and two boys had purple ears.
  - Draw the family pedigree and indicate what form of inheritance that the purple-ear trait most likely follows.

# **THE ULTIMATE PEDIGREE CHALLENGE**

**Is it possible for someone to be his own grandpa? This story is actually a song written by Dwight Latham and Moe Jaffe (1947, General Music Publishing Company, Inc.) Read the story (sing along if you dare) and draw the pedigree of this man's family. GOOD LUCK!**

**Many, many years ago when I was twenty-three  
I was married to a widow who was pretty as could be.  
This widow had a grown-up daughter who had hair of red.  
My father fell in love with her and soon the two were wed.**

**This made my dad my son-in-law and changed my very life  
For my daughter was my mother, 'cause she was my father's wife.  
To complicate the matter even though it brought me joy  
I soon became the father of a bouncing baby boy.**

**My little baby then became a brother-in-law to dad  
And so he became my uncle though it made me very sad  
For if he is my uncle then that also makes him brother,  
To the widow's lovely daughter who, of course, was my step-mother.**

**Father's wife then had a child which kept them on the run,  
And he became my grandchild, 'cause he was my daughter's son;  
My wife she is my mother's mother and it makes me blue,  
Because although she is my wife, she's my grandmother too.**

**Now if she is my grandmother than I'm her grandchild  
And every time I think of it, it nearly drives me wild;  
For now I have become the strangest case you ever saw  
As husband of my grandmother I am my own grandpa.**

**Chorus:**

**Oh, I'm my own grandpa, I'm my own grandpa  
It sounds funny, I know, but it really is so  
Oh, I'm my own grandpa**