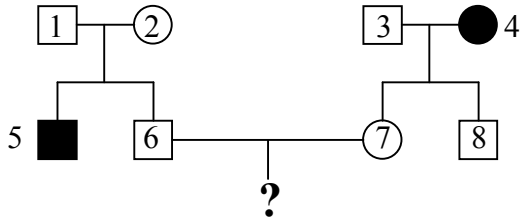
Section 5- Solution key:

1. In the box below, write the most likely mode of inheritance of the following pedigree?

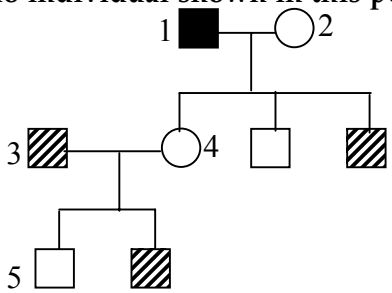


Autosomal recessive

Given each consistent mode of inheritance, if the couple in question decides to have a child, what is the probability of that child being affected? *(Note: Use the uppercase or lowercase A to represent the alleles for the dominant and recessive traits).*

The probability of individual 6 being a carrier is 2/3 and person 7 is a carrier. If they are both carriers then the probability of their child being a carrier is ¼. So the overall probability of their child being a carrier is (2/3 X 1X ¼) =1/6.

2. Consider the pedigree below showing the inheritance of two X-linked diseases, hemophilia A and hemophilia B. Hemophilia A is due to a lack of one clotting factor, and hemophilia B is due to a lack of a different clotting factor. Each clotting factor is a protein that is encoded by a specific gene located on the X chromosome. **Note that no individual shown in this pedigree is affected with both hemophilia A and hemophila B.**



Phenotypically normal

Affected with Hemophilia A

Affected with hemophilia B

a) Write the genotypes for the following individuals at both the hemophilia A and hemophilia B disease loci. Clearly define your genotype symbols.

Individual	Genotype
1	$X^{aB}Y$
2	$X^{Ab}X^{AB}$
3	$X^{Ab}Y$
4	$X^{aB}X^{Ab}$
5	$X^{AB}Y$

b) How do you account for individual 5 not being affected with either hemophilia A or hemophilia B?

Individual #5 is the product of a fusion of a sperm with an egg from individual 4that had undergone recombination between the A and the B genes during meiosis 1.

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