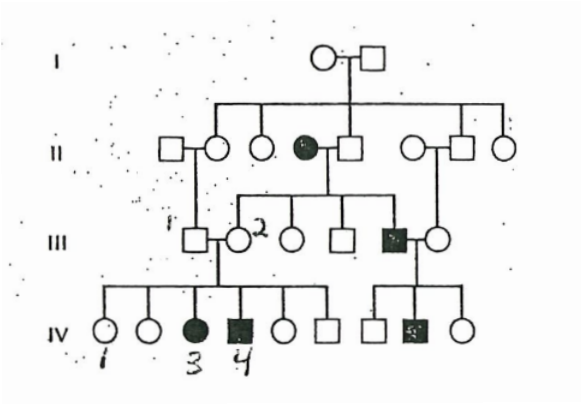
1.



a Give a mode of inheritance: **Autosomal recessive (AR)**

b Justify why that mode: **two instances of unaffected individuals having affected offspring, few individuals overall affected, both sexes affected.**

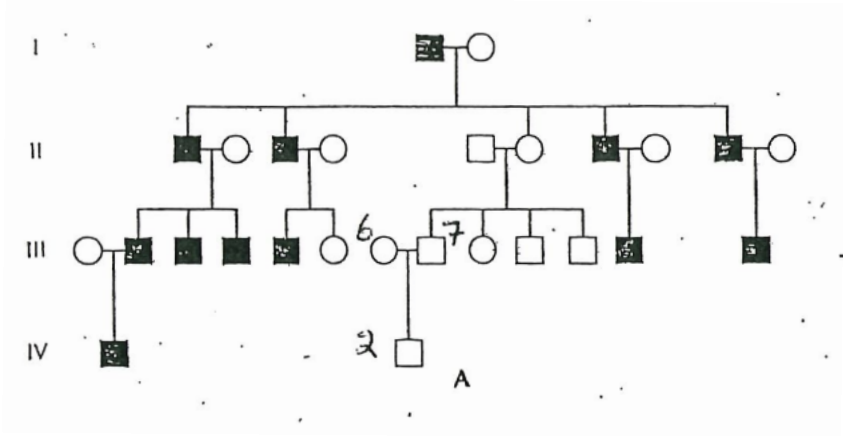
c Give the genotypes of: **[LEGEND: A = Normal, a = recessive; affected]**

III-1 : **Aa** IV-1 : **Aa/AA** IV-4 : **aa**

III-2 : **Aa** IV-3 : **aa**

d Risk to III 1×2 of having an affected child: **assuming Mendelian: 25%**

2.



a Give a mode of inheritance: **Y-linked**

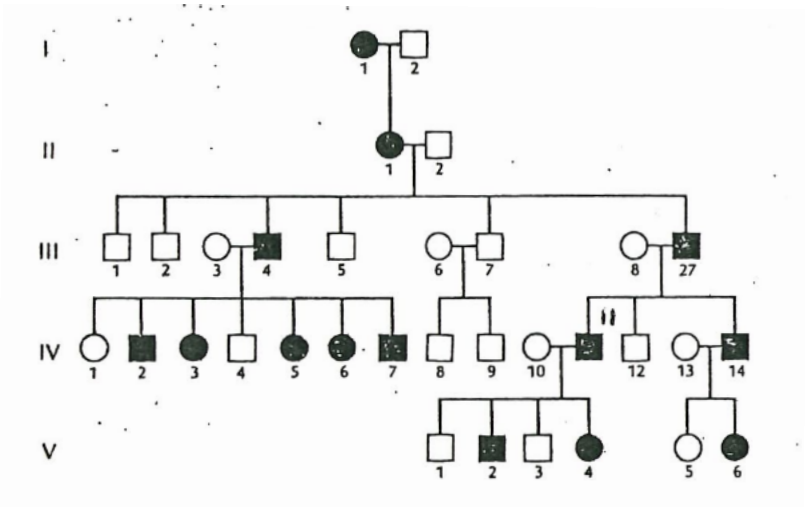
b Justify why that mode: **All affected fathers pass the disease to all sons, no father to daughter transmission**.

c Give the genotypes of: **[LEGEND: X = Female, Y = affected, y = normal]**

III-6 : **X** III-7 : **y** IV-2 : **y**

d Risk to III 6×7 of having an affected child: **assuming Mendelian: 0%**

3.



a Give a mode of inheritance: **Autosomal dominant (AD)**

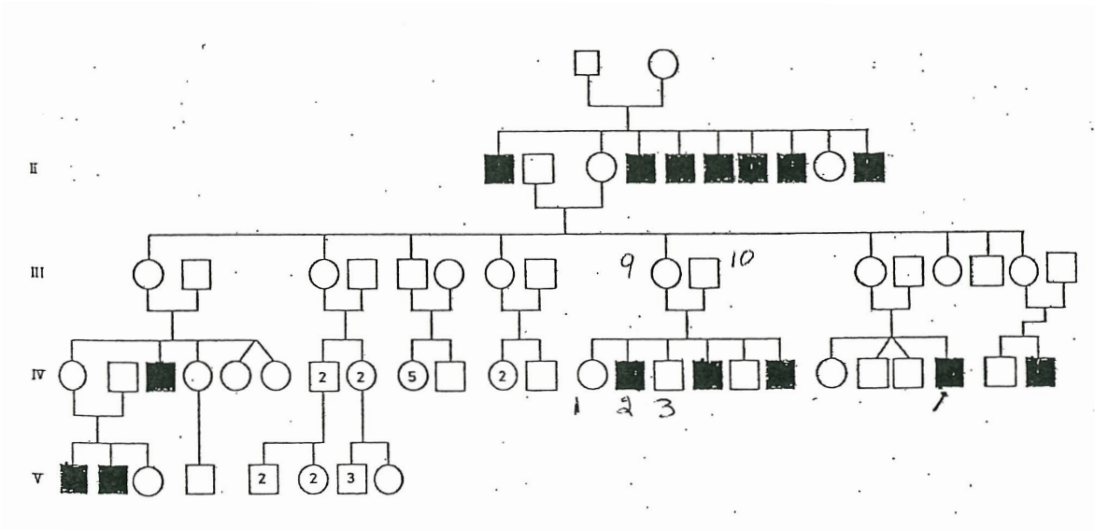
b Justify why that mode: **All affected individuals have a parent that is affected.**

c Give the genotypes of **[LEGEND: A = Normal, a = recessive; affected]**

IV-8 : **aa** IV-10 : **aa** IV-11 : **Aa**

d Risk to IV 10×11 of having an affected child: **assuming Mendelian: Aa×aa = 50%**

4.



a Give a mode of inheritance: **X-linked recessive (XR)**

b Justify why that mode: **Only males affected, but females can be carriers, no affected females.**

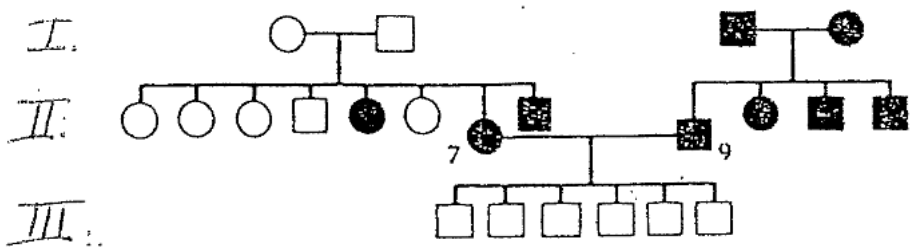
c Give the genotypes of **[LEGEND: X = Normal, x = recessive; affected]**

III-9 : **Xx** IV-1 : **Xx/XX** IV-3 : **YX**

III-10 : **YX** IV-2 : **Yx**

d Risk to III 9×10 of having an affected child: **M: 50% F:0%, but 50% carrier**

Extra Credit

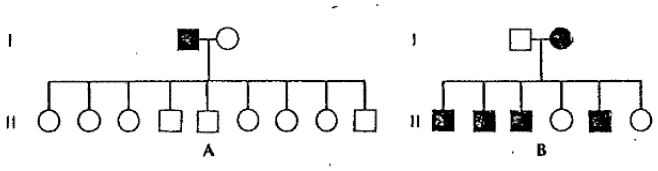


a Explain this pedigree: **Due to gene complementation, i.e., when two strains of an organism with different homozygous recessive mutations that produce the same mutant phenotype have offspring that express the wild-type phenotype when mated or crossed; AAbb×aaBB**.

b Genotype of a child in III: **AaBb (carriers)**

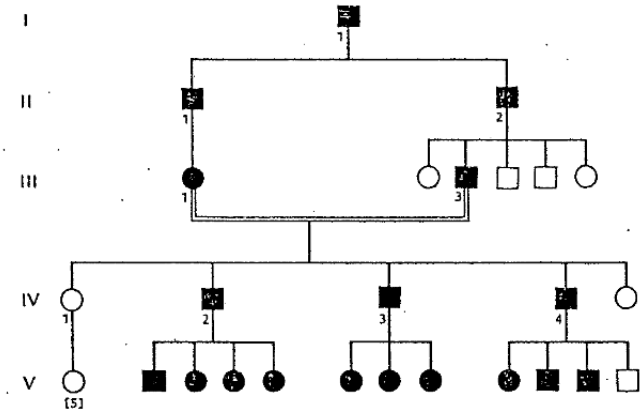
5. Give the mode of inheritance for the following pedigrees: (Assume the traits are rare)

a.



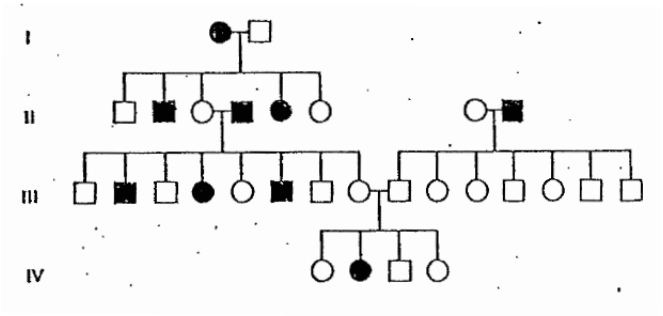
▷ **X-linked recessive**

b.



▷ **Autosomal dominant**

c.



▷ **Autosomal recessive**