Sex-Linked Inheritance Practice Problems

1. The gene for red/green colour blindness is recessive to the gene for normal vision. Both of these genes are carried on the X chromosome. What would you expect the genotype and phenotype rations to be when a normal-visioned male mates with a female who is homozygous for colour blindness?

2. What would you expect the genotype and phenotype ratios to be when a colour blind male mates with a heterozygous normal-visioned female?

3. What would you expect the genotype and phenotype ratios to be when a homozygous colour blind female mates with a colour blind male?

4. Hemophilia is an inherited disease that occurs when a person’s blood does not clot because their cells cannot produce a certain blood clotting factor called factor VIII. The gene for this type of hemophilia is sex-linked to the X chromsome and is recessive to the gene for normal blood clotting.

If a male hemophiliac mates with a female who is homozygous for normal blood clotting, can their kids have hemophilia? (show your work).

5. Why do hemophilia and red/green colour blindness occur mainly in males?

6.  A man with hemophilia (a recessive, sex-linked blood clotting disorder) has a daughter of normal phenotype.  She marries a man who is normal for the trait.

a) What is the probability that a daughter of this mating with be a hemophiliac?

b) What is the probability that a son will be a hemophiliac?