SBI 3C

Sex-Linked Traits Worksheet

1) Hemophelia is a disease where an individual's blood lacks agents necessary for blood clotting following an injury. In humans, the allele for hemophelia is sex-linked and recessive (X^h) to the normal gene for blood clotting (X^H). What would the genotypic and phenotypic ratios of the offspring resulting from the following crosses?
    a. A hemophiliac woman and a normal man?
    b. heterozygous carrier woman and a hemophiliac man?

2) Red-green colour blindness in a sex-linked recessive disorder. Explain why colour blind mothers always have colour blind sons.

3) A phenotypically normal couple have two sons who suffer from Duchene's muscular dystrophy, which is a sex-linked recessive disorder. An amniocentesis indicates the pregnant woman's fetus is a female. Should the couple worry that their future daughter will suffer from M.D. also? Explain, using a Punnett Square.

4) A sex-linked recessive gene (X^c) produces red-green colour blindness in humans. A phenotypically normal woman, whose father is colour blind, marries a colour blind man.
    a. What is the genotype of the woman and the man?

    b. What are the chances that the first child from this marriage will be a colour blind boy? Use a Punnett Square to show your answer.

5) The black and yellow pigments in the coats of cats are controlled by a sex-linked pair of alleles, located on the X chromosome. The calico cat is the heterozygous condition. To answer the questions below, use: (X^B) as the black allele and (X^Y) as the yellow allele.
    a. What are the genotypes of the following cats?
        i. Yellow female cat:
        ii. Yellow male cat:
        iii. Black female cat:
        iv. Black male cat:
        v. Calico cat:
    b. What are the genotype and phenotype ratios resulting from the mating of a black male cat and Calico female? Show using a Punnett Square.