Sex-Linked Genes

In fruit flies, eye color is a sex-linked trait. Red eyes are dominant. White eyes are recessive.

1. What are the gender and eye color of the flies with the following genotypes?

|	Gender	Eye Color
a) $X^R X^r$	_____	_____
b) $X^R X^R$	_____	_____
c) $X^R Y$	_____	_____
d) $X^r Y$	_____	_____
e) $X^r X^r$	_____	_____

2. What are the genotypes of the following flies?

Genotype

a) A white eyed male.   _____

b) A white eyed female.   _____

c) A heterozygous red eyed female.   _____

d) A red eyed male.   _____

3. Draw a Punnett square representing the cross between a white eyed female ($X^r X^r$) and a red eyed male ($X^R Y$).
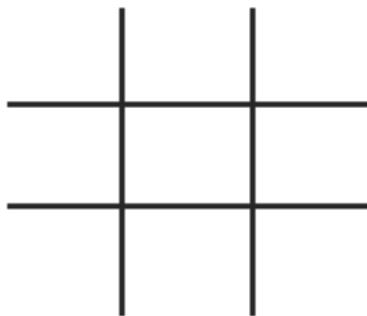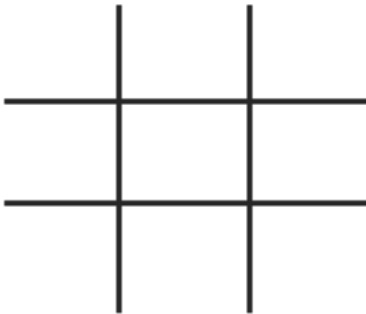
4. Draw a Punnett square representing the cross between a homozygous red eyed female and a white eyed male.
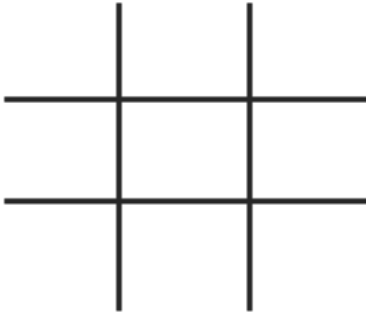
What is the probability that the offspring will be:

white eyed males _____

white eyed females _____

red eyed males _____

red eyed females _____

5. Draw a Punnett square representing the cross between a heterozygous red eyed female and a red eyed male.

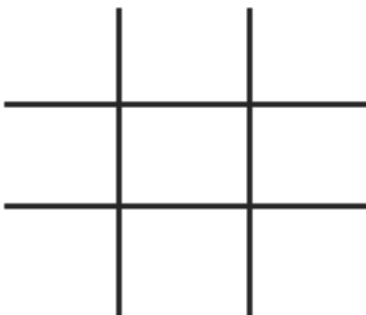What is the probability that the offspring will be:

white eyed males _____

white eyed females _____

red eyed males _____

red eyed females _____

Use the following information to answer questions 6 and 7.

In cats, the gene for calico (multicolored) is codominant. Females that receive a B (black) and an R (orange) gene have black and orange splotches on white coats. Males can only be black or orange, but never calico.
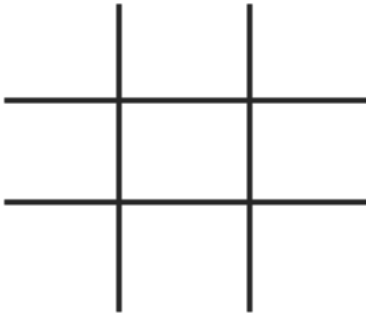
6. Draw a Punnett square representing the cross between a female calico and a black male.

What is the probability that the kittens will be:

black males? _____

calico males? _____

calico females? _____

7. Draw a Punnett square representing the cross between a black female and an orange male.

What is the probability that the kittens will be calico females? _____

What color will all the male cats be? _____

Use the information above to answer questions 8 to 10.

In humans, hemophilia is a sex-linked trait. Females can either have the disease, not have the disease, or be carriers. Males will either have the disease or not (they can't be carriers). The possible genotypes for hemophilia are shown below:

$X^H X^H$ = normal female $X^H Y$ = normal male
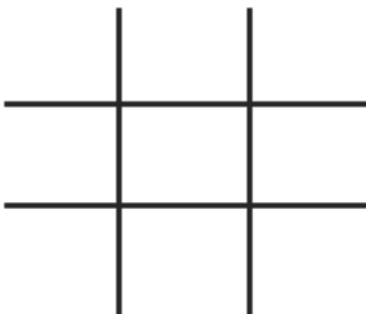
$X^H X^h$ = female carrier $X^h Y$ = male hemophiliac
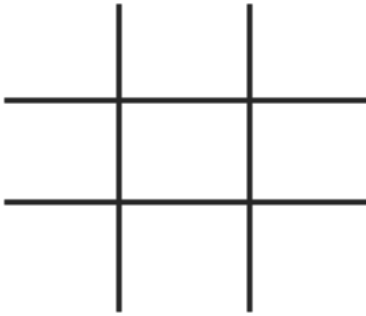
$X^h X^h$ = female hemophiliac

8. Draw a Punnett square representing the cross between a male hemophiliac and a female carrier.

What is the probability that these parents will have a child who has hemophilia? _____
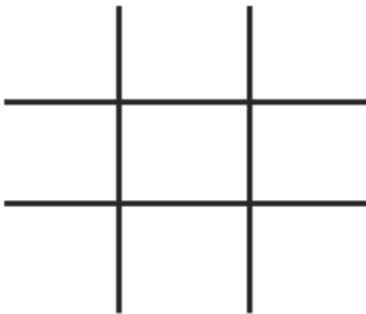
9. Draw a Punnett square representing the cross between a female carrier and a normal male.

What is the probability that these parents will have a child who has hemophilia? _____

What gender will a child who has hemophilia be? _____

10. Draw a Punnett square representing the cross between a female hemophiliac and a normal male.

What is the probability that their child will have hemophilia? _____

What gender will a child who has hemophilia be? _____