Genetics Problems: Dihybrid Crosses Name: _____

Complete the following problems using a separate piece of paper for each answer. Show all work and clearly label all alleles and ratios. When you turn in this assignment please staple them together in order (please write your name on all pages anyway). Be sure you write the number of the question you are answering in the upper right hand corner.

In mice the ability to run normally is a dominant trait. Mice with this trait are called running mice (R). The recessive trait causes mice to run in circles. Mice with this trait are called waltzing mice (r). Hair color is also an inherited trait in mice. Black hair (B) is dominant over brown hair (b).

1. Cross a heterozygous running heterozygous black mouse with a homozygous running, homozygous black mouse. What is the expected phenotypic ratio?

2. Cross a homozygous running, homozygous black mouse with a heterozygous running, brown mouse. What are the expected phenotypic and genotypic ratios?

3. Cross a waltzing brown mouse with a waltzing brown mouse. What are the expected phenotypic and genotypic ratios?

4. Cross a homozygous running, heterozygous black mouse with a waltzing brown mouse. What is the expected phenotypic ratio?

5. Cross a homozygous running, brown mouse with a heterozygous running, homozygous black mouse. What is the expected phenotypic ratio?

6. Cross a heterozygous running, heterozygous black mouse with a heterozygous running, heterozygous black mouse. What is the expected phenotypic ratio?

Sex Linked Traits

X-linked traits come from genes that are located on the X chromosome, and not on the y. (Remember women are XX and men are Xy). For example, hemophilia is a genetic disorder where a person can not form a blood clot. Hemophilia is a recessive sex-linked trait.

X^H or X^h The y chromosome stays blank in these examples because it does not carry an allele.

For the following questions take a single piece of unlined paper and fold it so it has four equal sized boxes when unfolded. Write your name up in the upper left hand corner and then number the boxes in the upper right hand corner. Solve one problem per a box. You must show your Punnett square for each problem.

1. Cross a carrier female with a male without hemophilia.
    a. What are the expected genotypic/phenotypic ratios?

2. Cross a carrier female with a male with hemophilia.
    a. What are the expected genotypic/phenotypic ratios?

3. Cross a female with hemophilia with a male without hemophilia.
    a. What are the expected genotypic/phenotypic ratios?

4. As a male, which member of your family should you look at to tell if you have hemophilia? Explain why. (Use a Punnett Square in your answer).

Incomplete Dominance

The size of a Bio 300 student's bladder is an inherited trait. It is controlled by single gene that has two alleles that are incompletely dominant.

BB = Big Bladder **Bb = Medium Bladder** **bb = Small Bladder**

It also happens to be true that the propensity for turning in your homework is an X- linked trait.

$X^I X^I$ will turn in work on time **$X^i X^i$ will turn in work late**

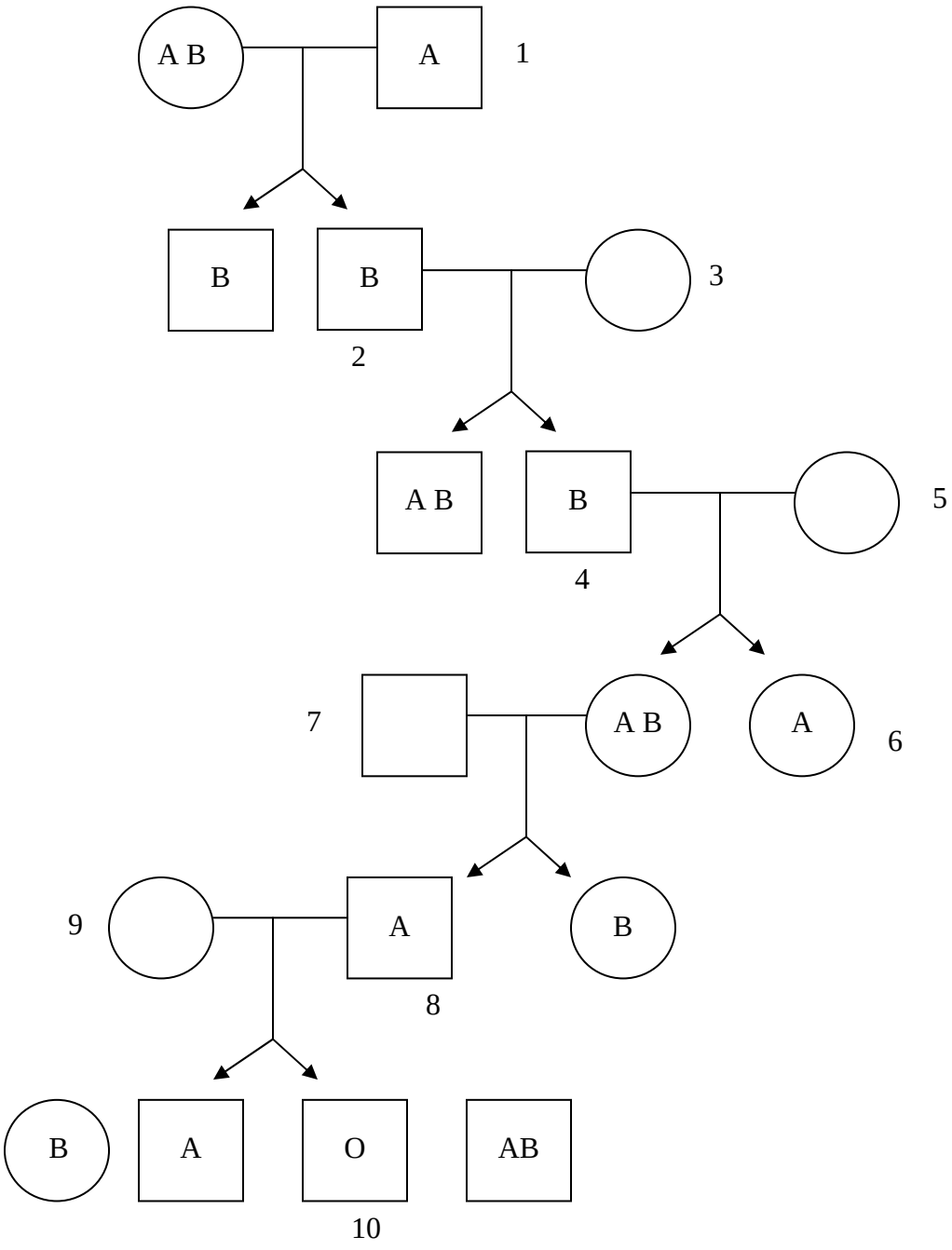
1. Cross a Big bladder male who turns in work late with a medium bladder female who is heterozygous for turning in work. What are the expected genotypic/phenotypic ratios?

2. Cross a Big bladder female who turns in work late with a medium bladder male who in turns in work on time. What are the expected genotypic/phenotypic ratios?

3. If a baby boy is a Medium Bladder late work turner inner. What are all of the possible combinations of parents that could have created him if we know that Mom has a small bladder?

Genetics Problems: ABO blood groups Name: _____

Below is a pedigree of ABO blood groups for several generations of human. Circles represent females and squares represent males. Horizontal lines directly connecting two people represent marriages, and children are connected to their parents by a vertical line down from the marriage line. For example, (b) and (c) are married to each other, and (d) is one of their two sons. Give the possible genotypes for each individual marked with a number on the appropriate line.



Genotypes

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____