Enter **02** in “Test/Quiz Number” column on scantron sheet

**Multiple-Choice Questions (2 points each)**

1) In the nuclei of somatic cells from an XXXY individual, you expect to see:

1. 4 Barr body.
2. 3 Barr body.
3. 2 Barr bodies.
4. 1 Barr bodies.
5. 0 Barr bodies.

2) A *Drosophila* with one X chromosome and 2 sets of autosomes is expected to be:

1. A female because of the absence of the Y chromosome.
2. A male because the ratio of X chromosome to autosomes is 1/2.
3. A male because of the presence of SRY gene on the X chromosome.
4. A male because of the random inactivation of X chromosome to compensate gene dosage.
5. A female because the ratio of X chromosome to autosomes is 1/2.

[](https://en.wikipedia.org/wiki/File:POL_wojew%C3%B3dztwo_zachodniopomorskie_COA.svg)3) In griffins (see right), the tail length is controlled by a locus T. The dominant allele T yields long tails, whereas griffins homozygous for the recessive allele t have short tails. Two long-tailed griffins were mated and the progeny phenotype has a ratio of 2 (long-tailed):1 (short-tailed). What is the likely explanation for this inheritance?

1. The T allele is associated with recessive lethality.
2. The T allele is dominant epistatic to the t allele.
3. The t allele is associated with recessive lethality.
4. The T allele exhibits incomplete dominance.
5. This inheritance is an example of complementation, with the t allele being recessive.

4) In a diploid plant, a white-flowered variety was crossed with another white-flowered variety. All F1 plants were red-flowered. When F1 plants were self-mated (F1 x F1), 9/16 of the F2 were red-flowered and 7/16 of the F2 were white-flowered. Based on this, which of the following statements is correct?

1. The red-flowered allele is associated with recessive lethality.
2. This inheritance is an example of complementation, with the white-flowered alleles being recessive.
3. This inheritance is an example of complementation, with the red-flowered alleles being recessive.
4. The red-flowered allele is dominant epistatic to the white-flowered allele.
5. The white-flowered allele is recessive epistatic to the red-flowered allele.

5) If the F1 plants in question 4) were testcrossed, what phenotypic ratio would be expected among the progeny?

1. All red.
2. 1 (red): 1 (white).
3. 3 (red): 1 (white).
4. 1 (red): 3 (white).
5. 9 (red): 7 (white).

Pigment in mouse fur is only produced when the *A* allele is absent. Individuals with an A allele are white. If the color is present, it is determined by the *B and b* alleles. *BB* or *Bb* results in agouti color, while *bb* results in black coats.

6) Based on the description, which of the following statements is correct regarding the inheritance of mouse fur (please circle one of the choices)?

1. A is dominant epistatic to B.
2. a is recessive epistatic to B.
3. B is dominant epistatic to A.
4. b is recessive epistatic to A.

In a cross between a white female (mouse 1) and a white male (mouse 2), the following progeny were obtained:

**Cross 1**

12 white

2 agouti

2 black

In another cross between the same white female (mouse 1) and an agouti male (mouse 3), the following progeny were obtained:

**Cross2**

8 white

6 agouti

2 black

7) What is the genotype of mouse 1?

1. AABb
2. AaBB
3. Aabb
4. AABB
5. AaBb

\*8) What is the genotype of mouse 3?

1. aaBb
2. AaBb
3. aaBb
4. aaBB
5. AaBb

\* Either A or C are acceptable.

Galactosemia is a recessive autosomal disorder, affecting an individual ability to properly metabolize the sugar galactose. You are a genetic counselor interviewing a phenotypically normal couple. They tell you that the male (1) has a paternal grandmother who has galactosemia and the female (2) has a sister with galactosemia. There are no other known cases in either of the families, and none the matings have been between related individuals. Assume that this trait is very rare.

9) What is the probability that NEITHER the male (1) and female (2) are carriers?

1. 1/2
2. 1/3
3. 2/3
4. 1/6
5. 1/12

10) What is the probability that one of them is carrier and the other is not?

1. 1/12
2. 1/2
3. 1/3
4. 2/3
5. 1/6