

Genetics 466 Homework #1. Due Friday February 6, 2004

Please circle the correct answer for each question (no scantron will be used) and return to us. If a question is unclear, please ask for a clarification before you answer it. In this and other homework, no partial credit can be given.

Question # 1: You are growing corn with two distinct phenotypes that segregate independently, seed color (yellow or purple), and taste (starchy or sweet). All your seeds are double heterozygotes for these two traits. They look purple and taste starchy. At harvest time (in the next generation), squirrels have eaten half your sweet corn. They ate your sweet corn primarily at night, without bias toward kernel color. What phenotypic ratio of your crop would you expect?

- a. 9 : 3 : 3 : 1
- b. 9 : 6 : 3 : 2
- c. 9 : 6 : 3 : 1
- d. 18 : 3 : 3 : 1
- e. 18 : 6 : 3 : 1

Question # 2: In a family of five children, what is the probability that:

i) the oldest four children are boys?

- a. 3/8
- b. 1/16
- c. 1/32
- d. 5/32
- e. 5/64

ii) at least 4 children are boys?

- a. 3/8
- b. 3/16
- c. 1/32
- d. 5/32
- e. 5/64

Question # 3: Draw a pedigree to help answer the following question:

Martha and Earl are both affected by a tooth disorder that is inherited in a simple Mendelian manner. They have three children - a boy without the disorder and two girls, Mary and Susan, with it. Susan marries an unaffected man and they have five children - three boys and two girls. All of the children have the disorder. What mode of inheritance best fits this pedigree, and what is Susan's most likely genotype?

- a. Autosomal dominant, AA
- b. Autosomal recessive, Aa

- c. Autosomal recessive, aa
- d. Autosomal dominant, Aa
- e. Likely not genetic

Question # 4. A female heterozygous Himalayan rabbit is crossed with a male wild type rabbit. The coats of the F1 rabbits are 5 wild type rabbits, 2 albino rabbits, and 2 himalayan rabbits. What is the genotype of the wildtype father. (See Snustad & Simmons, p. 75 for an explanation of the *c* gene).

- a. C(+),C
- b. C(+),C(ch)
- c. C(+),C(h)
- d. C(+),C(+)

Question # 5. A true-breeding variety of oat plants that produces black-hulled seeds is crossed to another true-breeding strain that produces white-hulled seeds. All the F1 progeny plants produce black-hulled seeds. The F1 plants are allowed to self-fertilize and the resulting F2 plants are scored for hull seed color. The observed number of F2 plants was: 50 producing black-hulled seeds, 12 producing gray-hulled seeds, and 4 producing white-hulled seeds.

(a) – (e) represent potential model pathways that may explain the observed results. Which model fits best with the observations?

