

Genetics Problems Review

- In pea plants, spherical seeds (S) are dominant to dented seeds (s). In a genetic cross of two plants that are heterozygous for the seed shape trait, what fraction of the offspring should have spherical seeds?
- In Mendel's experiments, if the gene for tall (T) plants was incompletely dominant over the gene for short (T*) plants, what would be the result of crossing two TT* plants?
 - 1/4 would be tall; 1/2 intermediate height; 1/4 short
 - 1/2 would be tall; 1/4 intermediate height; 1/4 short.
 - 1/4 would be tall; 1/4 intermediate height; 1/2 short.
 - All the offspring would be tall.
 - All the offspring would be intermediate.
- A genetic cross of inbred snapdragons with red flowers with inbred snapdragons with white flowers resulted in F1-hybrid offspring that all had pink flowers. When the F1 plants were self-pollinated, the resulting F2-generation plants had a phenotypic ratio of 1 red: 2 pink: 1 white. What type of inheritance does this trait show?
- A woman with type A blood and a man with type B blood could potentially have offspring with which blood types?
- What are the possible blood types of the offspring of a cross between individuals that are type AB and type O?
- Which of the following genetic crosses would be predicted to give a phenotypic ratio of 9:3:3:1?
 - SSYY x ssyy
 - SsYY x SSYy
 - SsYy x SsYy
 - SSyy x ssYY
 - ssYY x ssyy
- The gametes of a plant of genotype SsYy should have the genotypes:
 - Ss and Yy
 - SY and sy
 - SY, Sy, sY, and sy
 - Ss, Yy, SY and sy
 - SS, ss, YY, and yy

14. Several families were studied in which the father had normal vision and normal blood clotting, and the mother was a colorblind hemophiliac. The females from this cross that married and had children with males who were colorblind with hemophilia were then followed. The data from all of their offspring was tallied, and this is what was found:

Normal vision, normal clotting females: 124

Normal vision, hemophiliac females: 17

Red-green colorblind, normal clotting females: 24

Red-green colorblind, hemophiliac females: 135

Normal vision, normal clotting males: 117

Normal vision, hemophiliac males: 22

Red-green colorblind, normal clotting males: 32

Red-green colorblind, hemophiliac males: 109

- a. Show, using pictures, how these genes are linked and how these offspring could have been obtained.
- b. What is the percent of crossing over that occurred?
15. In humans, polydactyly (having extra fingers and toes) is dominant over having five fingers and toes. In a small island population, 49% of the population has five fingers and toes.
- a. What is the frequency of the recessive allele in the population?
- b. What percent of the population is homozygous dominant?
- c. What percent of the population is heterozygous?