

HONORS BIOLOGY – PROBLEM SET

CHAPTER 9: PATTERNS OF INHERITANCE

1. Tom has blood type B, but his father has blood type O. Additionally, he is colorblind. Gisele has blood type AB. She is a carrier for the colorblind allele. Colorblindness is a recessive, sex-linked trait. List the ratio of phenotypes of their offspring. Include the gender of the offspring. [2 points]
2. Think of at least one situation in which 2 parents can create offspring with each of the following phenotypic ratios:
 - a. 1:2:1 (incomplete dominance)
 - b. 1:1 (3 alleles)
 - c. 27:9:9:9:3:3:3:1

Be sure to state the genotypes of the parents and explain (prove) how you arrived at the appropriate ratio. [3 points]

3. Ronnie's genotype is AaBbCcDdEeFfGG. Sammi "the sweetest you'll ever meet" Sweetheart's genotype is AaBbCCDdEeFfgg. Answer the following questions about their genotypes: [3 points]
 - a. How many different types of sperm cells can Ronnie create? (Assume that Ronnie does NOT take steroids because steroids actually inhibit the production of sperm cells!)
 - b. How many different types of egg cells can Sammi create?
 - c. What are the odds that their child's genotype will be AABbCCDdeeFfGg?
4. Free earlobes (E) is dominant to attached earlobes (e). Brown eyes (B) is dominant to blue eyes (b). J-WOWW and "The Situation" have 300 children. Determine their genotypes if the following offspring are produced.
 - a. 60 attached-brown, 19 attached-blue, 162 free-brown, 59 free-blue (approximately a 3:1:9:3 ratio)
 - b. 148 free-blue, 152 attached-blue (approximately a 1:1 ratio)



Next, draw and complete a Punnett square for each part to confirm your answers. [2 points]