Genetics Review Problems #1 Name: Key 2021
Honors Biology 2021 Date: Block:

1. In *Drosophila* (the fruit fly often used in genetics experiments), red eyes are dominant to brown eyes, and a present spine is dominant to spineless. Many flies are produced from the mating of a male parent who is heterozygous for eye color and spineless with a female parent who has brown eyes and is heterozygous for spine.

R = red
r = brown
B = spine
b = spineless

Rrbb x rrBb

	rB	rb
Rb	RrBb	Rrbb
rb	rrBb	rrbb

   a. What fraction of the offspring will have brown eyes and present spine? 1/4

   b. What fraction of the offspring will have brown eyes and be spineless? 1/4

   c. What fraction of the offspring will have red eyes and present spine? 1/4

2. In crickets inhabiting the rapidly disappearing Amazonian rain forest, the alleles for long antennae and short antennae exhibit incomplete dominance. The heterozygous condition exhibits a barbed antennae.
   a. Diagram a cross between a homozygous long antennae cricket and a homozygous short antennae cricket. $C^LC^L \times C^eC^e$ = all barbed (C^LC^e)

   b. If 100 crickets were born from a cross between 2 crickets with barbed antennae, about how many would also have barbed antennae?

	C^L	C^e
C^L	C^LC^L	C^LC^e
C^e	C^LC^e	C^eC^e

25% long
50% barbed
25% short

50 crickets would be expected to have barbed

   c. How many would be homozygous for antennae length? 50% (50)

   d. How many would have short antennae? 25% (25)

3. There are three types of radishes: round, long and oval. What are the genotypes of the parents if the following are produced from separate crosses:
   a. 342 oval radishes $C^RC^R \times C^rC^r$

   b. 48 oval and 52 long $C^RC^r \times C^rC^r$

   c. 141 oval and 137 round $C^RC^R \times C^RC^r$

C^RC^R = round
C^RC^r = oval
C^rC^r = long

NOTE: These can be switched.

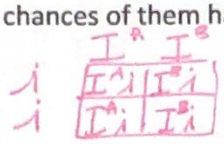
4. Two people, one with type O blood and one with type AB are planning to have offspring.
   a. What are the genotypes of the parents?

   $ii \times I^A I^B$

   b. What are the types of gametes they produce?

   i an I^A I^B

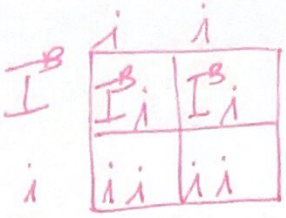
   c. Determine the chances of them having a child with type B blood.



50% chance

5. A female with type B blood has a child with a male with type O blood. Their first child has type O blood. What is the chance that their second child will have type B blood?

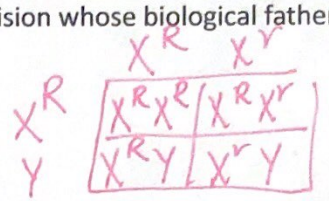
$I^B i \times ii$



50% each time

6. Red-green color blindness is a recessive sex-linked characteristic. A male with color vision has offspring with a female who also has color vision whose biological father was color-blind.

$X^R Y \times X^R X^r$



   a. What percentage of their female offspring will be expected to be color-blind?

   0%

   b. What percentage of their male offspring will be expected to be color-blind?

   50% of males

   c. What percentage of their female offspring will be carriers?

   50% females will be carriers

   d. Can any of their sons be carriers? Explain why or why not.

   No - XY can not carry because the X and Y chromosomes are non-homologous.