Drosophila Assignment

Data sets A and B:

A1

wild type, males	157
wild type, females	316
purple eyes, males	50
purple eyes, females	102
tan body, males	158
purple eyes, tan body, males	57

B1

a + +	613
+ + +	318
+ + c	372
+ b +	373
a b +	375
a + c	376
a b c	320
+ b c	623

Part A

Data set A summarizes F_2 numbers from a cross between two, true-breeding *Drosophila* strains (P generation), which differ with respect to two traits. The gene alleles can be dominant or recessive, and autosomal or X-linked.
For this part of the report do the following:

a) Attach your data set to your report so that we know which cross you were handling.

b) Name the classes and assign genetic symbols to the genes and alleles involved. For example if you suspect an X-linked trait, make it X^{r+} or X^{r}. If it's autosomal then *r* and r^+. (Replace the generic *r* with a letter(s) that best reflects something about the gene(s) you are examining.)

c) Produce one genetic hypothesis about the mode of inheritance of the genes from your data set. For example, the allele for yellow eyes is X-linked and recessive and the allele for long legs is autosomal dominant. Include the expected phenotypic ratios in the P, F_1, and F_2 generations. Note, for analysis, it will be simpler to treat each gene separately, and formulate a genetic hypothesis for each gene.

d) Illustrate your genetic hypothesis using a breeding diagram or a table in which the P, F_1 and F_2 generations and their phenotypes and genotypes are clearly indicated. Include the expected (predicted) phenotypic ratios for the P, F_1 and F_2 generations.

e) Analyze whether the data fits your hypothesis by the Chi-square test. Clearly present your results in a table form as you were shown in Tutorial 6. (Suggestion: the traits could be tested in males and females separately.)

> Keep in mind that you have to come up with a genetic hypothesis that both makes sense and will not be rejected. In order to test your genetic hypothesis, you must

formulate a null hypothesis. More then one hypothesis may work for a given data set, but you are only required to show one.

Part B

Data set B presents the results of a testcross using female flies heterozygous for three traits and male flies, which are homozygous recessive for the same three traits.
For this part of the report do the following:

a) Attach your data set to your report.
b) Clearly indicate parental, SCO and DCO classes in your report
c) Determine the gene order as you were shown in tutorial.
d) Rewrite the table using the correct gene order (make sure to correctly group SCO classes)
e) Calculate recombination frequencies (map distances)
f) Construct a genetic map for these three genes, including the map distances between them.

Clearly indicate the logic you followed and show all your calculations.

Your assignment has to be typed to obtain a full marks.