

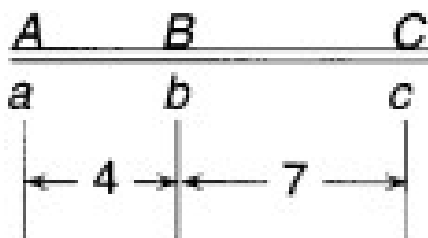
Practice Problems Set 3
(not to be evaluated)

1. The cross between the heterozygous ($h^+ jv^+ ve^+$) female parent and the homozygous recessive ($hh jvjv veve$) male (a testcross) yields the following progeny. The phenotypes of the progeny represent the alleles inherited from the heterozygous parent, for any recessive allele from the heterozygous parent is automatically homozygous in the offspring. The phenotypes of the progeny are given below. Calculate the map distances between the loci and the value of interference.

+	+	+	362
<i>jv</i>	+	+	4
+	+	<i>ve</i>	90
<i>jv</i>	+	<i>ve</i>	39
<i>jv</i>	<i>h</i>	<i>ve</i>	396
+	<i>h</i>	<i>ve</i>	2
+	<i>h</i>	+	34
<i>jv</i>	<i>h</i>	+	100
			<hr/> 1,027

2. Crossover map distances determined by two-point crosses are $P-C = 7$, $S-M = 10$, $C-M = 8$, $S-C = 2$, and $P-S = 5$. Draw a map of these four linked loci.

3. The accompanying figure shows the genotype of a trihybrid, together with the known map distances for the two regions. Assume no double crossovers, and determine the types and frequencies of gametes produced by this trihybrid. Then determine the expected genotypes in a sample of 1,000 progeny.



4. Consider two different loci in *Drosophila*- Groucho and Rough. A homozygous groucho fly (*gro*, bristles clumped above the eyes) is crossed with a homozygous rough fly (*ro*, eye abnormality). The F₁ females are testcrossed, producing these offspring:

groucho	518
rough	471
groucho, rough	6
wild-type	5
<hr/>	
	1,000

- What is the linkage arrangement of these loci?
- What offspring would result if the F₁ dihybrids were crossed among themselves instead of being testcrossed?

5. Following is a partial map of the third chromosome in *Drosophila*.

19.2 javelin bristles (*ju*)

43.2 thread arista (*th*)

66.2 Delta veins (*Dl*)

70.7 ebony body (*e*)

a. If flies heterozygous in cis position for javelin and ebony are mated among themselves, what phenotypic ratio do you expect in the progeny?

b. A true-breeding thread, ebony fly is crossed with a true-breeding Delta fly. An F₁ female is test-crossed to a thread, ebony male. Predict the expected progeny and their frequencies for this cross. Assume no interference.

c. Repeat (b), but assume a coefficient of coincidence of 0.4.