

Genetics 320 Problem Set Four

Due Friday, 16 September

1. (2 points): 1000 linear tetrads from A/a are scored, and the following numbers are observed:

linear tetrad	number seen
aaAA	390
aAaA	90
AAaa	410
AaaA	110

- (a) What is the frequency of first division segregation? Of second division segregation?
- (b) What is the recombination frequency between the **A** locus and the centromere?

2. (3 points): Consider *unordered* tetrads from the cross Ab/aB , where the tetrads were

tetrad members	number seen
Ab, aB, ab, AB	138
ab, ab, AB, AB	12
Ab, Ab, aB, aB	150

- (a) Identify the parental, nonparental, and tetratypes.
- (b) What is the recombination fraction between the **A** and **B** loci?

3. (5 points): In a cross of $cr^+ al \times cr al^+$, 100 ordered tetrads were scored. These fell into the following five types (Labeled A - F), with the numbers observed given below the label.

Tetrad A	Tetrad B	Tetrad C	Tetrad D	Tetrad E	Tetrad F
38	2	40	13	4	3
$cr +$	$cr al$	$cr al$	$cr +$	$cr al$	$cr al$
$cr +$	$cr al$	$cr +$	$+ al$	$+ +$	$+ al$
$+ al$	$+ +$	$+ al$	$cr +$	$cr +$	$cr +$
$+ al$	$+ +$	$+ +$	$+ al$	$+ al$	$+ +$

- (a) What tetrad types are parental? Nonparental? Tetratypes?
- (b) For locus cr , which tetrad types show second division segregation?
- (c) For locus al , which tetrad types show second division segregation?
- (d) What is the genetic map (position and recombination frequencies of the loci with respect to each other and the centromere)?
- (e) Draw what crossover(s) at the 4-strand stage give rise to tetrad type F.