

Tetrad Analysis Homework

1 From the tetrads below, determine the map for the cross: a trp1 x α his5

I			II			III			IV		
a	his+	trp1	a	his+	trp1	a	his+	trp1	a	his+	trp1
a	his+	trp1	α	his+	trp1	a	his5	trp1	a	his+	trp+
α	his5	trp+	a	his5	trp+	α	his+	trp+	α	his5	trp1
α	his5	trp+	α	his5	trp+	α	his5	trp+	α	his5	trp+
461			62			4			73		

2 From the tetrads below, determine the map for the cross: a trp1 x α his5

I			II			III			IV		
a	his+	trp1	a	his+	trp1	a	his+	trp1	a	his+	trp1
a	his+	trp1	α	his+	trp1	a	his5	trp1	a	his+	trp+
α	his5	trp+	a	his5	trp+	α	his+	trp+	α	his5	trp1
α	his5	trp+	α	his5	trp+	α	his5	trp+	α	his5	trp+
1065			2			75			58		

3 From the tetrads below, determine the map for the cross: a trp1 x α his5

I			II			III			IV		
a	his+	trp1	a	his+	trp1	a	his+	trp1	a	his+	trp1
a	his+	trp1	α	his+	trp1	a	his5	trp1	a	his+	trp+
α	his5	trp+	a	his5	trp+	α	his+	trp+	α	his5	trp1
α	his5	trp+	α	his5	trp+	α	his5	trp+	α	his5	trp+
523			23			59			6		

- 4 In the cross $a\text{ ura2} \times \alpha\text{ leu4}$, two genes are linked and one is unlinked. Determine which gene is unlinked and calculate the map distance for the linked genes

I	II	III	IV
a ura2 leu+	a ura2 leu4	a ura2 leu4	a ura2 leu+
a ura2 leu+	a ura2 leu4	a ura+ leu4	a ura+ leu+
α ura+ leu4	α ura+ leu+	α ura2 leu+	α ura2 leu4
α ura+ leu4	α ura+ leu+	α ura+ leu+	α ura+ leu4
270	276	33	21

- 5 In the cross $a\text{ ura2} \times \alpha\text{ leu4}$, two genes are linked and one is unlinked. Determine which gene is unlinked and calculate the map distance for the linked genes

I	II	III	IV
a leu+ ura2	α leu+ ura2	a leu+ ura2	α leu+ ura2
a leu+ ura2	α leu+ ura2	a leu+ ura+	α leu+ ura+
α leu4 ura+	a leu4 ura+	α leu4 ura2	a leu4 ura2
α leu4 ura+	a leu4 ura+	α leu4 ura+	a leu4 ura+
320	318	25	21

- 6 In the cross $a\text{ ura2} \times \alpha\text{ leu4}$, two genes are linked and one is unlinked. Determine which gene is unlinked and calculate the map distance for the linked genes

I	II	III	IV
a leu4 ura2	a leu+ ura2	a leu4 ura2	a leu+ ura2
a leu4 ura2	a leu+ ura2	a leu4 ura+	a leu+ ura+
α leu+ ura+	α leu4 ura+	α leu+ ura2	α leu4 ura2
α leu+ ura+	α leu4 ura+	α leu+ ura+	α leu4 ura+
179	185	16	20

- 7 The genes *mat*, *thr*, and *arg* are linked as indicated in the map below. Fill in the table below of expected tetrads and numbers from the cross α thr5 x a arg7. Assume that you recover 500 tetrads.



Non Recombinants	Single XO mat - thr	Single XO thr - arg	Double XO mat - thr - arg
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- 8 The genes *mat*, *thr*, and *arg* are linked as indicated in the map below. Fill in the table below of expected tetrads and numbers from the cross α thr5 x a arg7. Assume that you recover 900 tetrads.



Non Recombinants	Single XO mat - arg	Single XO arg - thr	Double XO mat - arg - thr
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- 9 The genes *mat*, *thr*, and *arg* are linked as indicated in the map below. Fill in the table below of expected tetrads and numbers from the cross α thr5 x a arg7. Assume that you recover 500 tetrads.



Non Recombinants	Single XO thr - mat	Single XO mat - arg	Double XO mat - thr - arg
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Tetrad Analysis Homework - Questions

Problem 1

- 1 Which gene is in the middle?
 - a MAT
 - b HIS
 - c TRP

- 2 The distance HIS – TRP is
 - a 5.5 cM
 - b 6.08 cM
 - c 6.42 cM
 - d 11.92 cM
 - e 11.25 cM

- 3 The cM value in #2 for the distance HIS – MAT is

- 4 The cM value in #2 for the distance MAT – TRP is

Problem 2

- 5 Which gene is in the middle?
 - a MAT
 - b HIS
 - c TRP

- 6 The distance HIS – TRP is
 - a 3.28 cM
 - b 2.5 cM
 - c 5.78 cM
 - d 5.54 cM
 - e 2.42 cM

- 7 The cM value in #6 for the distance HIS – MAT is

- 8 The cM value in #6 for the distance MAT – TRP is

Problem 3

- 9 Which gene is in the middle?
 - a MAT
 - b HIS
 - c TRP

- 10 The distance HIS – TRP is
 - a 5.32 cM
 - b 2.37 cM
 - c 1.86 cM
 - d 7.69 cM
 - e 6.71 cM

- 11 The cM value in #10 for the distance HIS – MAT is

- 12 The cM value in #10 for the distance MAT – TRP is

Problem 4

- 13 Which gene is unlinked?
- a MAT
 - b URA
 - c LEU
- 14 The distance between the linked genes is
- a 24.75 cM
 - b 25.75 cM
 - c 4.5 cM
 - d 2.75 cM
 - e 1.75 cM

Problem 5

- 15 Which gene is unlinked?
- a MAT
 - b URA
 - c LEU
- 16 The distance between the linked genes is
- a 3.36 cM
 - b 1.83 cM
 - c 1.54 cM
 - d 25.07 cM
 - e 25.56 cM

Problem 6

- 17 Which gene is unlinked?
- a MAT
 - b URA
 - c LEU
- 18 The distance between the linked genes is
- a 24.88 cM
 - b 23.13 cM
 - c 2.5 cM
 - d 2.0 cM
 - e 4.5 cM

Problem 7

- 19 Which tetrad represents non-recombinants?

a	b	c	d
a thr ⁺ arg ⁷	a thr ⁺ arg ⁷	a thr ⁺ arg ⁷	a thr ⁺ arg ⁷
a thr ⁵ arg ⁷	a thr ⁺ arg ⁺	a thr ⁺ arg ⁷	α thr ⁺ arg ⁷
α thr ⁺ arg ⁺	α thr ⁵ arg ⁷	α thr ⁵ arg ⁺	a thr ⁵ arg ⁺
α thr ⁵ arg ⁺	α thr ⁵ arg ⁺	α thr ⁵ arg ⁺	α thr ⁵ arg ⁺

- 20 How many non-recombinant tetrads do you expect?
- | | |
|-------|-------|
| a 423 | d 378 |
| b 422 | e 392 |
| c 420 | |
- 21 Which tetrad in question #19 represents a single crossover between MAT and THR?
- 22 How many tetrads do you expect to have a single crossover between MAT and THR?
- | | |
|------|------|
| a 38 | d 46 |
| b 45 | e 32 |
| c 31 | |
- 23 Which tetrad in question #19 represents a single crossover between THR and ARG?
- 24 How many tetrads do you expect to have a single crossover between THR and ARG?
- | | |
|------|------|
| a 38 | d 46 |
| b 45 | e 32 |
| c 31 | |
- 25 Which tetrad in question #19 represents the double recombinants?
- 26 How many double recombinant tetrads do you expect?
- | | |
|-----|-----|
| a 1 | d 4 |
| b 2 | e 5 |
| c 3 | |

Problem 8

- 27 Which tetrad in question #19 represents non-recombinants?
- 28 How many non-recombinant tetrads do you expect?
- | | |
|-------|-------|
| a 788 | d 790 |
| b 792 | e 796 |
| c 794 | |
- 29 Which tetrad in question #17 represents a single crossover between MAT and ARG?
- 30 How many tetrads do you expect to have a single crossover between MAT and ARG?
- | | |
|------|------|
| a 39 | d 41 |
| b 43 | e 65 |
| c 67 | |
- 31 Which tetrad in question #19 represents a single crossover between ARG and THR?
- 32 How many tetrads do you expect to have a single crossover between ARG and THR?
- | | |
|------|------|
| a 39 | d 41 |
| b 43 | e 65 |
| c 67 | |

- 33 Which tetrad in question #19 represents the double recombinants?
- 34 How many double recombinant tetrads do you expect?
- | | |
|-----|-----|
| a 1 | d 4 |
| b 2 | e 5 |
| c 3 | |

Problem 9

- 35 Which tetrad in question #19 represents non-recombinants?
- 36 How many non-recombinant tetrads do you expect?
- | | |
|-------|-------|
| a 423 | d 421 |
| b 422 | e 418 |
| c 420 | |
- 37 Which tetrad in question #19 represents a single crossover between MAT and ARG?
- 38 How many tetrads do you expect to have a single crossover between MAT and ARG?
- | | |
|------|------|
| a 23 | d 28 |
| b 24 | e 54 |
| c 29 | |
- 39 Which tetrad in question #19 represents a single crossover between MAT and THR?
- 40 How many tetrads do you expect to have a single crossover between MAT and THR?
- | | |
|------|------|
| a 23 | d 28 |
| b 24 | e 54 |
| c 29 | |
- 41 Which tetrad in question #19 represents the double recombinants?
- 42 How many double recombinant tetrads do you expect?
- | | |
|-----|-----|
| a 1 | d 4 |
| b 2 | e 5 |
| c 3 | |