

MIDTERM 1. MCB 104. Genetics, Genomics, and Cell Biology Spring 2013.

NAME:

SID:

Points:

Pg. 2. Definitions:

Pg. 3. Short answers:

Pg. 4. Short answers:

Pg. 5: Problem set:

Pg. 6: Problem set:

Pg. 7: Problem set:

Total Points:

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I. Definitions. 2 pts each.

1. centiMorgan
2. anther
3. CTCF
4. merozygote
5. nondysjunction
6. Barr body
7. episome
8. Spo 11
9. Branch migration
10. codominance
11. pleiotropy
12. auxotroph
13. Turner's syndrome
14. heteroduplex DNA
15. Gynandromorph

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III. Problem sets.

1. (10 pts). A cross is made between an Hfr strain that is $arg^+ bio^+ leu^+$ and an F- that is arg^- , bio^- , leu^- . Interrupted mating experiments showed that arg is the last gene transferred from Hfr. Exconjugants were grown on medium lacking arginine and recombinant bacteria were tested for all possible combinations of genotypes:

$arg^+ bio^+ leu^+$ 320

$arg^+ bio^+ leu^-$ 8

$arg^+ bio^- leu^+$ 0

$arg^+ bio^- leu^-$ 48

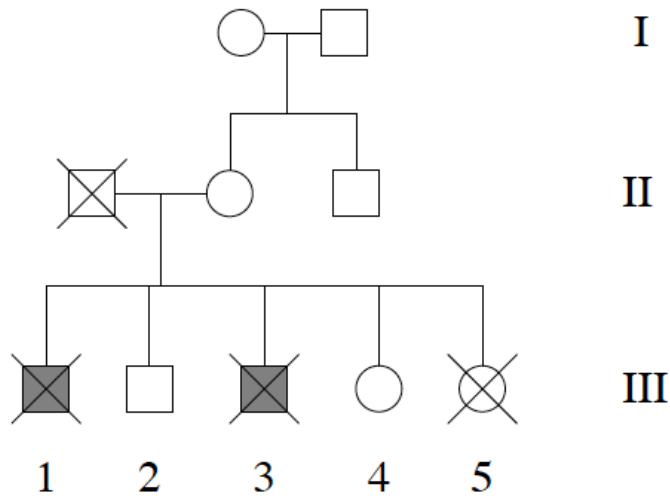
a. Why was arginine excluded from the growth medium?

b. What is the gene order?

c. What are the map distances between the gene pairs?

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3. (10 pts). The human genes for colorblindness and hemophilia are linked on the X chromosome and map 10 cM away from one another. Consider the following pedigree. Shading identifies hemophiliacs and X identifies color blind individuals.



What is the probability that individual III-4 will have a hemophiliac son?

What is the probability that individual III-5 will have a hemophiliac son?