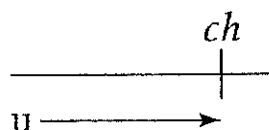


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Make a map of the four genes involved in these crosses, giving gene order and map distances between the genes. If more than one map is possible, draw all possible maps.

***6.29** In *Drosophila*, a cross of

$$\frac{a^+ b^+ c d e}{a b c^+ d^+ e^+} \times \frac{a b c d e}{a b c d e}$$

gave 1,000 progeny of the following 16 phenotypes:

Genotype	Number
(1) $a^+ b^+ c d e$	220
(2) $a^+ b^+ c d e^+$	230
(3) $a b c^+ d^+ e$	210
(4) $a b c^+ d^+ e^+$	215
(5) $a b^+ c^+ d^+ e$	12
(6) $a b^+ c^+ d^+ e^+$	13
(7) $a^+ b c d e^+$	16
(8) $a^+ b c d e$	14
(9) $a b^+ c^+ d e^+$	14
(10) $a b^+ c^+ d e$	13
(11) $a^+ b c d^+ e^+$	8
(12) $a^+ b c d^+ e$	8
(13) $a^+ b^+ c^+ d e^+$	7
(14) $a^+ b^+ c^+ d e$	7
(15) $a b c d^+ e^+$	6
(16) $a b c d^+ e$	7

- Draw a genetic map of the chromosome, indicating the linkage of the five genes and the number of map units separating each.
- From the single-crossover frequencies, what would be the expected frequency of $a^+ b^+ c^+ d^+ e^+$ flies?