

Practice 3-3

Parallel and Perpendicular Lines

In a soon-to-be-built town, all streets will be designated either as avenues or as boulevards. The avenues will all be parallel to one another, the boulevards will all be parallel to one another, and in the middle of town, Center City Boulevard will intersect Founders Avenue at right angles. Is each of the following statements true or false? Justify your answer in each case.

1. Every avenue will be perpendicular to every boulevard. _____

2. All city blocks will be rectangular. _____

3. All city blocks will be bordered on one side by either Center City Boulevard or Founders Avenue. _____

***a, b, c, d, and e* are distinct lines in the same plane. For each combination of relationships between *a* and *b*, *b* and *c*, *c* and *d*, and *d* and *e*, how are *a* and *e* related?**

4. $a \parallel b, b \parallel c, c \perp d, d \parallel e$ _____
5. $a \perp b, b \parallel c, c \parallel d, d \perp e$ _____
6. $a \parallel b, b \parallel c, c \perp d, d \perp e$ _____
7. $a \perp b, b \perp c, c \perp d, d \perp e$ _____
8. Suppose you are given information about a sequence of lines, ℓ_1 through ℓ_n , in the following form:

$$\ell_1 \square \ell_2, \ell_2 \square \ell_3, \ell_3 \square \ell_4, \dots, \ell_{n-2} \square \ell_{n-1}, \text{ and } \ell_{n-1} \square \ell_n,$$

where each \square is either a \parallel or a \perp . Now you are asked whether $\ell_1 \parallel \ell_n$ or $\ell_1 \perp \ell_n$. How can you decide by simply counting the number of \perp statements in the given information?

All rights reserved.

© Pearson Education, Inc., publishing as Pearson Prentice Hall.