

## Study Guide

## Verifying Segment Relationships

Proofs in geometry follow the same format that you used in Lesson 2-4. The steps in a two-column proof are arranged so that each step follows logically from the preceding one. The reasons can be given information, definitions, postulates of geometry, or rules of algebra. You may also use information that is safe to assume from a given figure.

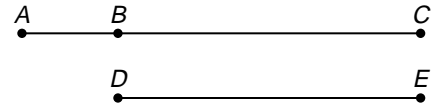
**Example:** Write a two-column proof.

**Given:**  $\overline{BC} \cong \overline{DE}$

**Prove:**  $AC = AB + DE$

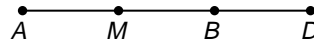
**Proof:**

| Statements                             | Reasons                             |
|--|-------------------------------------|
| a. $\overline{BC} \cong \overline{DE}$ | a. Given                            |
| b. $BC = DE$                           | b. Definition of congruent segments |
| c. $AC = AB + BC$                      | c. Segment Addition Postulate       |
| d. $AC = AB + DE$                      | d. Substitution Property (=)        |



**Complete each proof by naming the property that justifies each statement.**

1. **Given:**  $M$  is the midpoint of  $\overline{AB}$ .  
 $B$  is the midpoint of  $\overline{MD}$ .

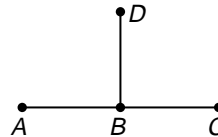


**Prove:**  $MD = 2MB$

**Proof:**

| Statements  | Reasons  |
|---|----------|
| a. $M$ is the midpoint of $\overline{AB}$ .<br>$B$ is the midpoint of $\overline{MD}$ . | a. _____ |
| b. $AM = MB$<br>$MB = BD$   | b. _____ |
| c. $MD = MB + BD$   | c. _____ |
| d. $MD = MB + MB$   | d. _____ |
| e. $MD = 2MB$   | e. _____ |

2. **Given:**  $A$ ,  $B$ , and  $C$  are collinear.  
 $AB = BD$   
 $BD = BC$



**Prove:**  $B$  is the midpoint of  $\overline{AC}$ .

**Proof:**

| Statements  | Reasons  |
|---|----------|
| a. $A$ , $B$ , and $C$ are collinear.<br>$AB = BD$<br>$BD = BC$ | a. _____ |
| b. $AB = BC$  | b. _____ |
| c. $B$ is the midpoint of $\overline{AC}$ .                     | c. _____ |