

## Section 7.4 Parallel Lines and Proportional Parts

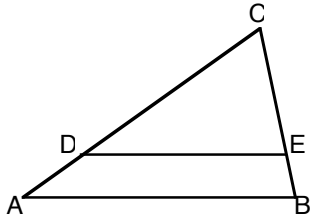
### Objective

To use proportional parts of triangles to solve problems and to divide a segment into congruent parts.

### Theorems

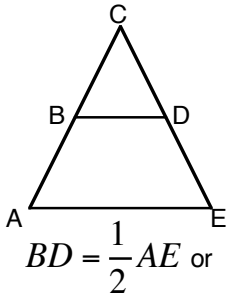
#### Triangle Proportionality

If a line is parallel to one side of a triangle and intersects the other two sides in two distinct points, then it separates these sides into segments of proportional lengths.



$$\frac{AD}{DC} = \frac{BE}{EC}$$

If a line intersects two sides of a triangle and separates the sides into corresponding segments of proportional lengths, then the line is parallel to the third side.

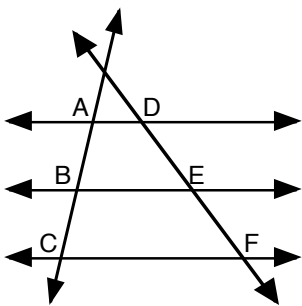


$$BD = \frac{1}{2} AE \text{ or}$$

$$2BD = AE$$

A segment whose endpoints are the midpoints of two sides of a triangle is parallel to the third side of the triangle, and its length is one-half the length of the third side.

### Corollaries



If three or more parallel lines intersect two transversals, then they cut off the transversal proportionally.

If three or more parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.

$$\frac{AB}{BC} = \frac{DE}{EF}, \frac{AC}{DF} = \frac{BC}{EF}, \frac{AC}{BC} = \frac{DF}{EF}$$