

# Geometry Info Sheet #33

## Triangle Similarity and Proportionality Theorems

### Theorems

**AA (Angle-Angle) Similarity Theorem:** If two angles of one triangle are congruent to two angles of a second triangle, then the two triangles are similar.

**SSS (Side-Side-Side) Similarity Theorem:** If the three sides of one triangle are proportional to the three sides of a second triangle, then the two triangles are similar.

**SAS (Side-Angle-Side) Similarity Theorem:** If two sides of one triangle are proportional to two sides of a second triangle, and their included angles are congruent, then the two triangles are similar.

**Triangle Proportionality Theorem:** If a line parallel to one side of a triangle intersects the other two sides, then the line divides those two sides proportionally. This theorem is sometimes called the Side-Splitter Theorem.

**Converse of TPT:** If a line divides two sides of a triangle proportionally, then the line is parallel to the third side of the triangle.

**Triangle Angle Bisector Theorem:** If a line bisects an angle of a triangle, then the line divides the opposite side into two segments that are proportional to the other two sides of the triangle.

### Corollary to Triangle Proportionality Theorem

Three or more parallel lines divide two intersecting transversals proportionally.

If two triangles are similar, then their perimeters, as well as their corresponding altitudes, medians, and angle bisectors, will all have the same ratio as their corresponding sides.