Geometry Info Sheet #3

Congruency and Perpendicularity; Segment Bisectors and Relationships

Definitions

Space: The set of all points

Length: The distance between two points

Two figures are **congruent** if they are the same size and shape.

The mathematical symbol for congruency is: $\cong$

A **fair ruler** is a (straight) line with markings in equal intervals from one to the next, and can be constructed with a straightedge and a compass.

Two lines (or a line and a plane, or two planes) are **perpendicular** if they intersect at a 90-degree angle.

The mathematical symbol used to indicate that two figures are perpendicular is: $\perp$

The **midpoint of a segment** is the point that divides the segment into two congruent segments.

A **segment bisector** is a point, ray, line, segment, or plane that intersects a segment at its midpoint (dividing it into two congruent segments).

A **perpendicular bisector** is a segment bisector that intersects a segment at a 90-degree angle.

Postulates

Segment Congruence Postulate: If two segments have the same length, then they are congruent. If two segments are congruent, then they have the same length.

Segment Addition Postulate: If point *R* is between points *P* and *Q* on a line, then the length of *PR* plus the length of *RQ* equals the length of *PQ* (*PR* + *RQ* = *PQ*).

Formulas

In a coordinate plane, the **midpoint of a segment** with endpoints (x_1, y_1) and (x_2, y_2) has the coordinates $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$. The coordinates of the midpoint are the averages of the coordinates of the endpoints.

Distance d in a coordinate plane **between two points** (x_1, y_1) and (x_2, y_2): $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$