Congruence Encyclopedia Article

Congruence

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Two geometric figures are said to be congruent if they differ from each other only in their position in **space**. Perhaps the simplest examples of this are parallel line segments of the same length or parallel rays. Two triangles of the same size and shape are easily seen as congruent as well. In a more general sense, two geometric figures are congruent if they can be transformed into each other (as in being overlaid or made to coincide with one another) by some numeric **translation**, **rotation**, and/or reflection. This can easily be seen in the rectangular coordinate system using a linear equation such as $x_1=2y+1$. If the **range** for y is from **zero** to two, this equation can be graphed as a line segment that starts at one on the x axis and ends at coordinates x=5, y=2. Given the same range for y, the equation $x_2=2y+2$ graphs as a line segment parallel to and the same length as that created by the previous equation, but starting at x=2, y=0 and ending at x=6, y=2. This is a very simple example of congruence. A **transformation** equal to -1 is all that is required to transpose the first line segment into the other.

Two **square** matrices, A and B, are congruent if there is another **matrix** C that can be used to transform A into B or vice versa. C is said to be the transpose of A or B and contains numbers in each position in the matrix that provide the value to transform one matrix into the other.