Altitude Encyclopedia Article

Altitude

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Altitude

The altitude of a **triangle** is the perpendicular line which joins one vertex of a triangle to a point on the opposite side. (A line joining the vertex to an arbitrary point is called a cevian.) Each acute triangle has exactly three altitudes. The three altitudes of such a triangle always meet at a central point known as the orthocenter. Obtuse and right triangles also have altitudes. However, for a right triangle, one of the legs is an altitude, and the orthocenter lies along the edge of the triangle. For obtuse triangles, the sides must be extended a certain **distance** to allow for a perpendicular to be formed. In this case, the orthocenter will lie outside the triangle itself.

The altitude is most commonly used in calculations of the **area** of a triangle: the area can be found by halving the product of a side with the altitude perpendicular to that side. The altitude can also be calculated indirectly if one already knows the area or if one knows the lengths of all the sides (from which Heron's formula is used to calculate the area; see **Hero's formula**). The altitude is among the geometric properties commonly used in proofs and theorems, as well as in construction of figures using compass and straightedge.