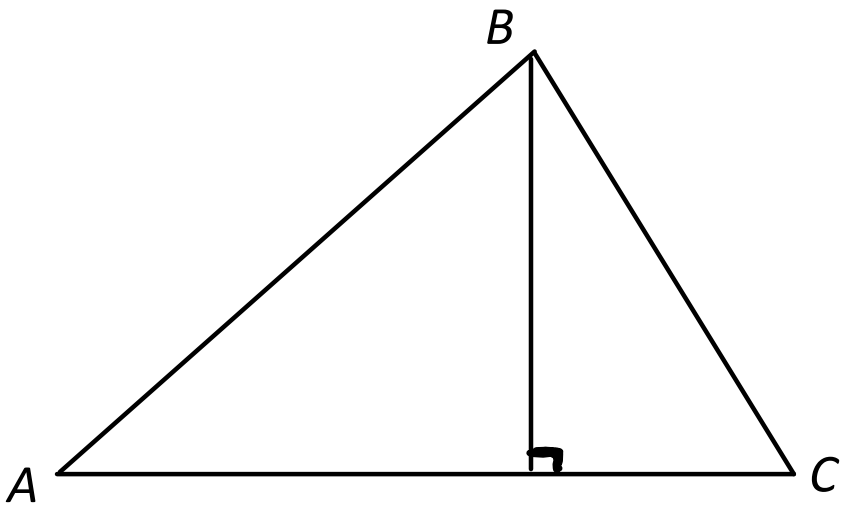
Altitude of a Triangle

A segment that is drawn from the vertex of a triangle, perpendicular to the opposite side



Given: $\overline{AD}$ is an altitude of ΔABC

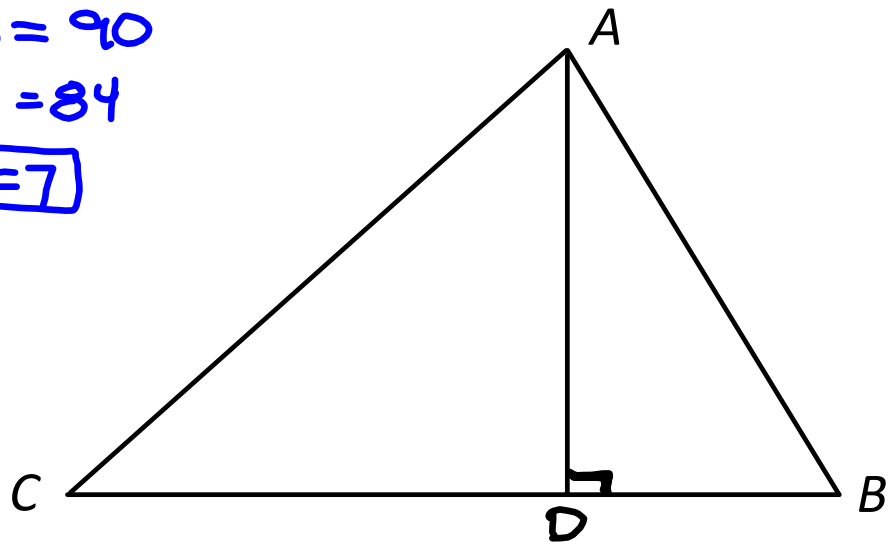
$m\angle ADB = (12x + 6)^\circ$

Find x

$12x + 6 = 90$

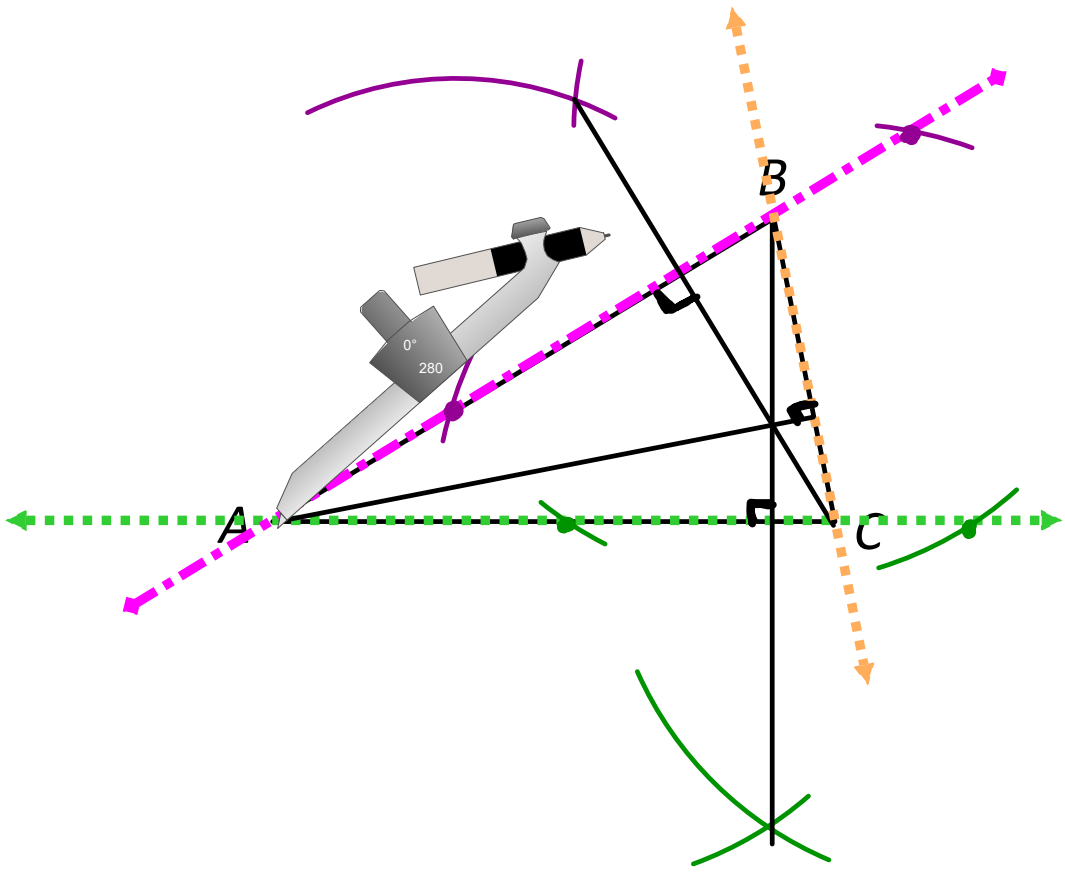
$12x = 84$

$\boxed{x = 7}$



Constructing the Altitudes of a Triangle

1. Choose a side and extend it in both directions
2. Set the compass on the opposite vertex, and adjust its width to beyond the side
3. Make two arcs intersecting the line
4. From the two points of intersection, without adjusting the width of the compass, draw two overlapping arcs beyond the side of the triangle
5. Using a straightedge, connect this point of intersection with the vertex in order to create the altitude
6. Repeat the process to construct the two other altitudes

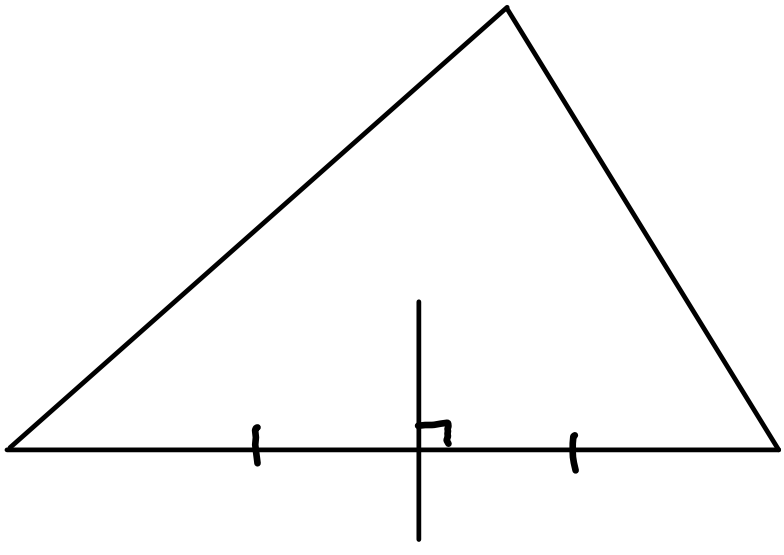


Orthocenter of a Triangle

- point of concurrency for the altitudes of a triangle
- acute triangles - inside
  obtuse triangles - outside
  right triangles - at vertex of right angle

Perpendicular Bisector of a Triangle

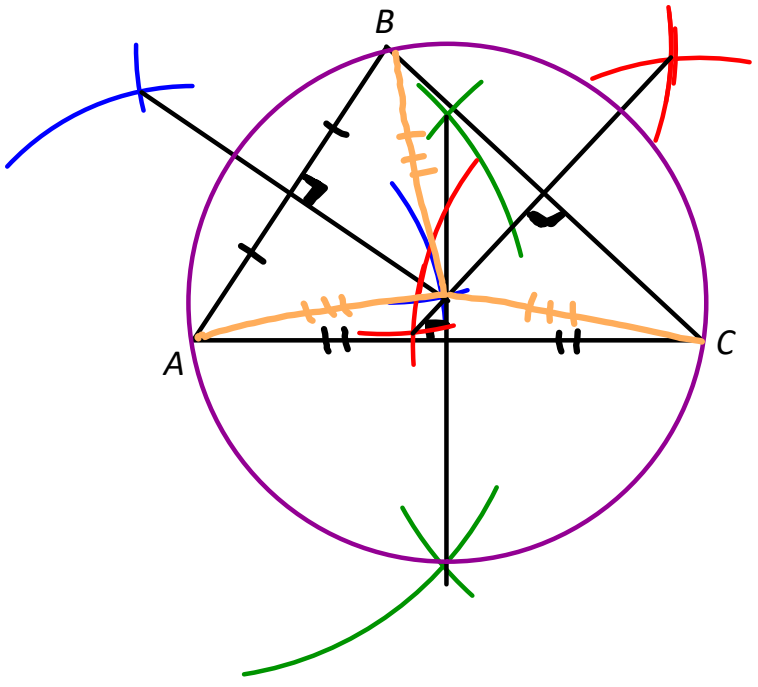
A segment that is the perpendicular bisector of a side of a triangle

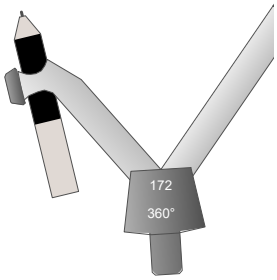


Circumcenter of a Triangle

- point of concurrency for the perpendicular bisectors of a triangle
- can be outside of a triangle
- center of the circumscribed circle
- equidistant to each... vertex!

Construct the circumcenter of the triangle:





Incenter of a Triangle

- point of concurrency for the angle bisectors of a triangle
- always in the interior of a triangle
- center of the inscribed circle
- equidistant to each... side!

Construct the incenter of the triangle: