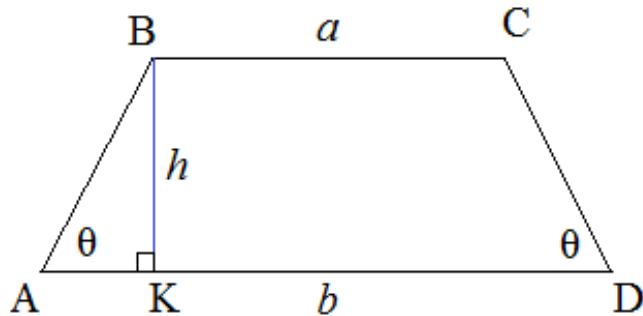


Answer on Question #70611, Math / Geometry

If the length of both bases and the overall height of an Isosceles Trapezoid are known, is there a formula to determine the interior angles of the shorter base? I know that both angles will be the same. (Need to cut a piece of material with a mitre saw and need to use the saw's angle gauge to make the cut)

Solution



Let $ABCD$ be an Isosceles Trapezoid ($AB = CD$)

We know

b is the length of the larger base AD

a is the length of the smaller base BC

h is the length of the overall height BK

Then

$$AK = \frac{AD - BC}{2} = \frac{b - a}{2}$$

Consider the right triangle $\triangle ABK$

$$\tan(\angle BAK) = \tan \theta = \frac{BK}{AK} = \frac{h}{\frac{b - a}{2}} = \frac{2h}{b - a}$$

Hence

$$\angle ABC = 180^\circ - \angle BAK = 180^\circ - \arctan\left(\frac{2h}{b - a}\right) = \angle BCD$$

$$\text{Answer: } \angle ABC = \angle BCD = 180^\circ - \arctan\left(\frac{2h}{b - a}\right), \quad b > a.$$

Answer provided by <https://www.AssignmentExpert.com>