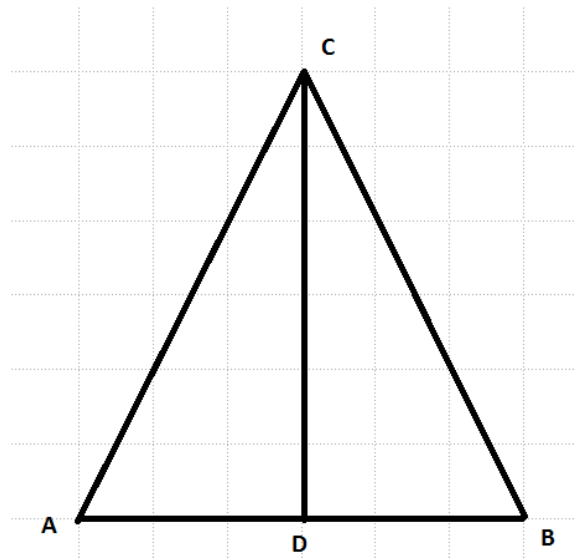


Question #56860, Math / Geometry

1. The ratio of the base of an isosceles triangle to its altitude is 3:4. Find the measures of the angles of the triangle.
2. Two altitudes of an isosceles triangle are equal to 20 cm and 30 cm. Determine the possible measures of the base angles of the triangle.
3. The area of a triangle is equal to 48cm^2 and two of its sides measure 12 cm and 9 cm, respectively. Find the possible measures of the included angles of the given sides.

Answer.

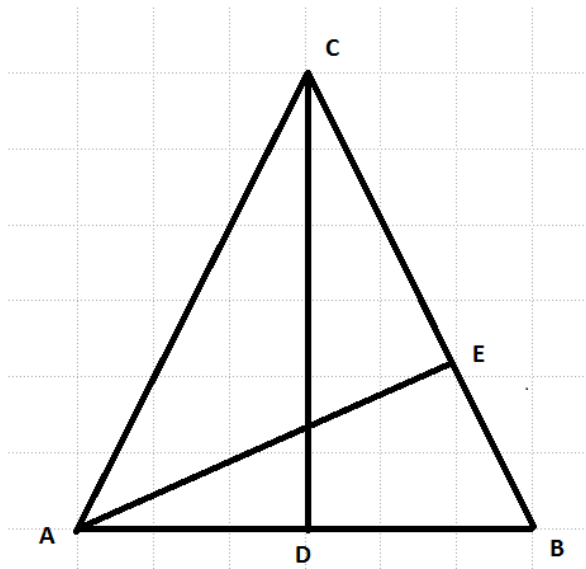
1.



$$\frac{AB}{CD} = \frac{3}{4} \rightarrow \tan \angle A = \tan \angle B = \frac{CD}{\frac{AB}{2}} = \frac{8}{3} \rightarrow$$

$$\angle A = \angle B = \arctan \frac{8}{3} \approx 69.44^\circ, \quad \angle C = 180^\circ - 2 * 69.44^\circ = 41.12^\circ$$

2.



$$CD = 30, AE = 20.$$

$$\triangle ABC \sim \triangle ABE \rightarrow \frac{AB}{CB} = \frac{AE}{CD} = \frac{20}{30} = \frac{2}{3} \rightarrow AB = \frac{2}{3}CB \rightarrow BD = \frac{1}{3}CB \rightarrow$$

$$\rightarrow \angle B = \angle A = \arccos \frac{BD}{CB} = \arccos \left(\frac{1}{3} \right) \approx 70.53^\circ$$

$$3. S = \frac{1}{2}ah = \frac{1}{2}12 * 9\sin\alpha = 48 \rightarrow \sin\alpha = \frac{48}{54} = \frac{8}{9} \rightarrow$$

$$\rightarrow \alpha = \arcsin \left(\frac{8}{9} \right) \approx 62.73^\circ$$