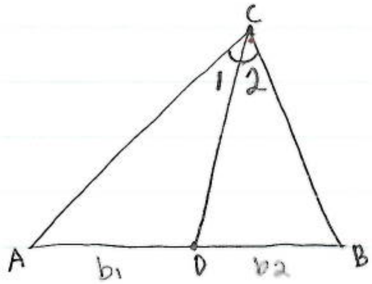
Nichole Cunningham
HW 2 #9



given: $\angle 1 = \angle 2$

prove: $\frac{AD}{AC} = \frac{BD}{BC}$ ETS $\frac{AD}{BD} = \frac{AC}{BC}$

by thm 22: $\begin{cases} \text{Area}(\Delta ACD) = \frac{1}{2} AC \cdot CD \sin \angle 1 \\ \text{Area}(\Delta BCD) = \frac{1}{2} BC \cdot CD \sin \angle 2 \end{cases}$

using given: $\text{Area}(\Delta BCD) = \frac{1}{2} BC \cdot CD \sin \angle 1$

by Algebra: $\frac{\text{Area}(\Delta ACD)}{AC} = \frac{\text{Area}(\Delta BCD)}{BC} = \frac{1}{2} CD \cdot \sin \angle 1$

→ Using AD and BD as bases, with a shared height, h

Algebra & thm 7: $\frac{\text{Area}(\Delta ACD)}{\text{Area}(\Delta BCD)} = \frac{AC}{BC} = \frac{\cancel{\frac{1}{2}} \cdot \overset{AD}{\cancel{b_1}} \cdot \cancel{h}}{\cancel{\frac{1}{2}} \cdot \underset{BD}{\cancel{b_2}} \cdot \cancel{h}}$

(or with $b_1 = AD$ & $b_2 = BD$)

Therefore: $\frac{AC}{BC} = \frac{AD}{BD}$