



Ptolemy's Theorem

$$(AC)(BD) = (AB)(CD) + (AD)(BC)$$

choose E s.t. $\angle ABE = \angle CBD$

$$\Rightarrow \angle ABD = \angle EBC$$

$$\angle BDA = \angle BCA$$

$$\Rightarrow \triangle BEC \sim \triangle BAD$$

$$\angle CAD = \angle CBD$$

$$\frac{BC}{AD} = \frac{BX}{AX}$$