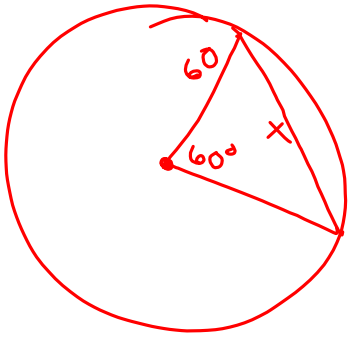
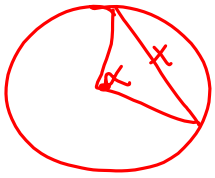
$x = crd(\alpha)$

$crd(60^\circ) = 60$





$crd\ 120 = crd(180-60)$

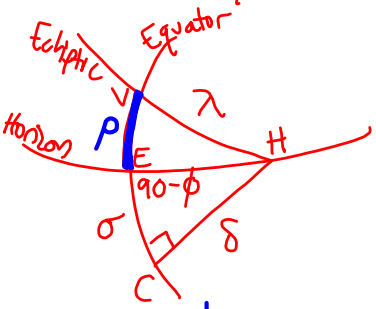
$= \sqrt{(2R)^2 - crd^2(60)}$

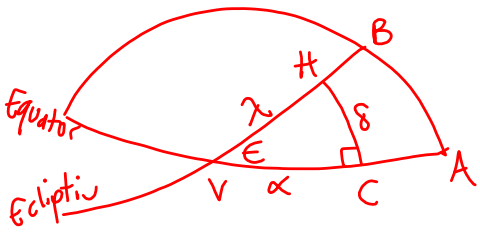
$= \sqrt{120^2 - 60^2}$

$120\ crd(\alpha-\beta) = crd\,\alpha\ crd(180-\beta) - crd\,\beta\ crd(180-\alpha)$

$\sqrt{2} = 1.414\ldots$

12. Calculate the rising times $\rho(\lambda,\phi)$ for $\phi = 45°$ and $\lambda = 60°$.





$\epsilon = 23°51'20''$
λ = longitude
ϕ = latitude
δ = declination
α = right ascension

ρ rising time $= \alpha(\lambda) - \sigma(\lambda,\phi)$

$\sin\delta = \sin\epsilon\sin\lambda$
$\tan\alpha = \cos\epsilon\tan\lambda$

If $\lambda = 60°$, then $\delta = 20°30'$
& $\alpha = 57°44'$

$\sin\sigma = \tan\delta \cdot \tan 45°$ (5.3)
$\sigma = 21.57°$

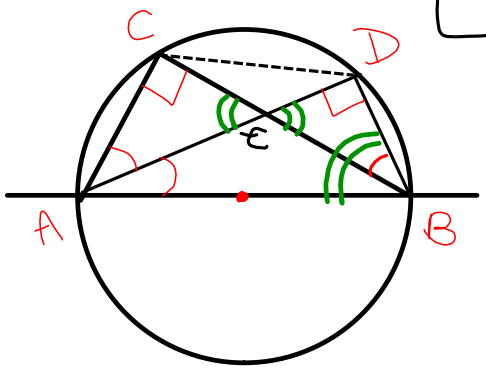
$\rho = \alpha - \sigma = 35°47'$

Ch 4 Lemma 2

Let AB be the diameter of a circle and ACB a right $\triangle$ inscribed in semicircle. Let AD bisect $\angle CAB$ and meet the circle @ D. Connect DB. Then

$\frac{AB^2}{BD^2} = 1 + \frac{(AB+AC)^2}{BC^2}$ and $AD^2 = AB^2 - BD^2$

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



$\frac{AD}{DB} = \frac{BD}{DE} = \frac{AC}{CE} = \frac{AB}{BE} =$

$= \frac{AB+AC}{CE+BE} = \frac{AB+AC}{BC}$