R = radius of Earth, L = observer's latitude, G = angle of declination circle. Compare to figure 2 from online discussion

From the figure we see that $H = Rsin(G)$, $a = Rcos(G)$,

$(a - x) = Htan(L) = Rsin(G)tan(L)$.

So $(a - x)/a = Rsin(G)tan(L)/Rcos(G) = [sin(G)/cos(G)] * tan(L)$.

$(a - x)/a = tan(G) * tan(L)$.