(10-9) The Coriolis force will have a southward component since in the local coordinate system

$$\vec{\omega} = (\sin\lambda\ \hat{U} + \cos\lambda\ \hat{N})\,\omega$$

$\hat{N}$ = North
$\hat{U}$ = Up
$\hat{E}$ = East

and $\vec{V} = V_0 \cos\alpha\ \hat{E} + (V_0 \sin\alpha - gt)\ \hat{U}$

So, $\vec{a}_c = -2\vec{\omega}\times\vec{V} = 2\vec{V}\times\vec{\omega}$

$$= 2\omega\Big[V_0 \cos\alpha \sin\lambda\ \hat{S} + V_0 \cos\alpha \cos\lambda\ \hat{U} + \cos\lambda\,(V_0 \sin\alpha - gt)\ \hat{W}\Big]$$

Ignoring the west and up components gives

$$d = \frac{1}{2} a_c T_0'^2 = \frac{1}{2} 2 V_0 \cos\alpha \sin\lambda \left(\frac{2V_0 \sin\alpha}{g}\right)^2 \omega$$

$$= 4\frac{V_0^3}{g^2} \cos\alpha \sin^2\alpha \sin\lambda\ \omega$$

[Here T_0' is the total time, equal to twice the time taken to go from start to the top when $V_{up} = 0$. Thus, $T_0' = 2\dfrac{V_0 \sin\alpha}{g}$.]