(50 points)
Reflection on a boundary

8-1. Assume a simple reflected seismic ray in the following configuration:

![Reflection Diagram]

a) Given a raypath shown above in a layer of thickness $Z$, constant velocity $V$, and horizontal distance $X$, derive the equation for a travel time $T$ of the reflected seismic wave shown above.

b) Rewrite the equation from a) for horizontal distance $X$ in terms of $T$, $Z$, and $V$.

c) Assuming a constant velocity $V=7.726$ km/s and a layer thickness $Z=100$ km, plot the travel time $T$ vs. distance $X$ on the interval $0 \text{ km} \leq X \leq 200 \text{ km}$.

d) What happens to the shape of the curve for distances $X>>Z$? Why?