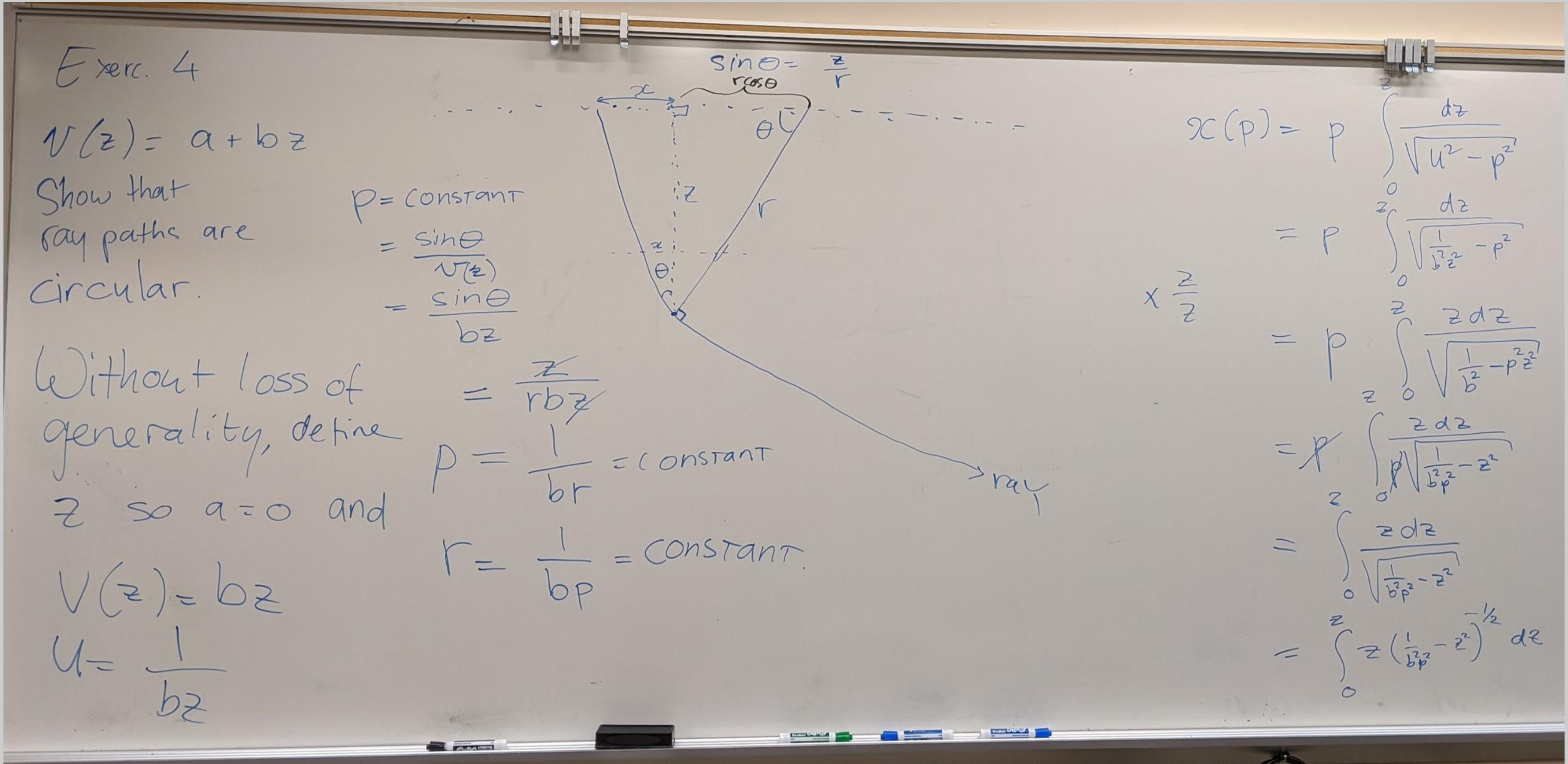
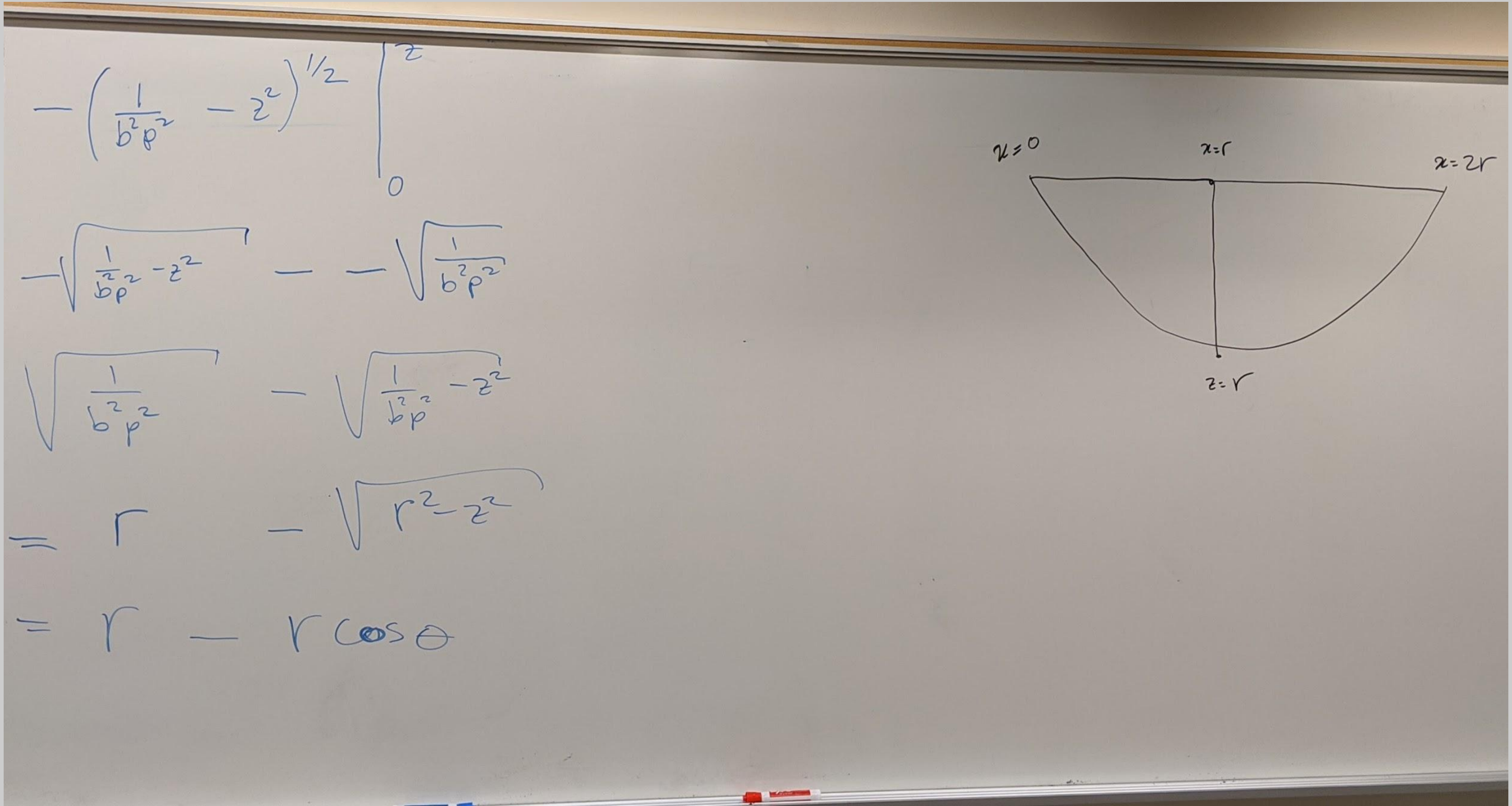
Ray Theory: Amplitude and Phase

February 5, 2020

But first: Exercise 4 of Chapter 4



Exercise 4 of Chapter 4 - continued



Amplitudes of seismic waves

- Decrease due to geometrical spreading
- Decrease due to anelasticity (intrinsic attenuation)
- Decrease or increase due to interaction with discontinuities
- Small scale heterogeneity have an overall effect of decreasing phase amplitudes due to scattering

Energy density → $\tilde{E} = \tilde{E}_k + \tilde{E}_w$

k: kinetic

w: work (potential energy, strain energy)

$\frac{1}{2}mv^2$

$\tilde{E}_k = \frac{1}{2}\rho \dot{u}^2$ ← particle motions $\frac{\partial u}{\partial t}$ where u = displacement.

$\tilde{E}_w = \frac{1}{2}\tau_{ij} e_{ij}$