47 cont

$$n^2 - p_x^2 - p_y^2 = \frac{n^2}{1+(x')^2+(y')^2} \Rightarrow$$

$$\boxed{H = -\left[n^2(\vec{r}) - p_x^2 - p_y^2\right]^{1/2}}$$

d) Hamilton says

$$p_x' = -\frac{\partial H}{\partial x}, \quad p_y' = -\frac{\partial H}{\partial y}.$$

But for the sheet of glass $\frac{\partial n}{\partial x} = \frac{\partial n}{\partial y} = 0$

$\Rightarrow p_x' = p_y' = 0 \Rightarrow p_x + p_y$ are

continuous across interface:

Without loss of generallity, we may rotate the coordinate system about the z axis so that $p_y^{in} = 0 \Rightarrow p_y^{fin} = 0 \Rightarrow$

$(y')^{in} = (y')^{fin} = 0 \Rightarrow$ refraction occurs in a plane.