22. (a) We use $\Delta y = D\lambda/d$ (see Sample Problem 36-2). Because of the placement of the mirror in the problem $D = 2(20.0\,\text{m}) = 40.0\,\text{m}$, which we express in millimeters in the calculation below:

$$d = \frac{D\lambda}{\Delta y} = \frac{(4.00 \times 10^4\,\text{mm})(632.8 \times 10^{-6}\,\text{mm})}{100\,\text{mm}} = 0.253\ \text{mm}\ .$$

(b) In this case the interference pattern will be shifted. At the location of the original central maximum, the effective phase difference is now $\frac{1}{2}$ wavelength, so there is now a minimum instead of a maximum.