

75. (a) A path length difference of  $\lambda/2$  produces the first dark band, of  $3\lambda/2$  produces the second dark band, and so on. Therefore, the fourth dark band corresponds to a path length difference of  $7\lambda/2 = 1750 \text{ nm}$ .
- (b) In the small angle approximation (which we assume holds here), the fringes are equally spaced, so that if  $\Delta y$  denotes the distance from one maximum to the next, then the distance from the middle of the pattern to the fourth dark band must be  $16.8 \text{ mm} = 3.5\Delta y$ . Therefore, we obtain  $\Delta y = 16.8/3.5 = 4.8 \text{ mm}$ .