50. (a) From $d \sin\theta = m\lambda$ we find

$$d = \frac{m\lambda_{\text{avg}}}{\sin\theta} = \frac{3(589.3\,\text{nm})}{\sin 10^\circ} = 1.0 \times 10^4\,\text{nm} = 10\,\mu\text{m} \ .$$

(b) The total width of the ruling is

$$L = Nd = \left(\frac{R}{m}\right) d = \frac{\lambda_{\text{avg}} d}{m\Delta\lambda} = \frac{(589.3\,\text{nm})(10\,\mu\text{m})}{3(589.59\,\text{nm} - 589.00\,\text{nm})} = 3.3 \times 10^3 \mu\text{m} = 3.3\ \text{mm} \ .$$