P #32 (cont)

Find angle of refraction from glass to air (θ_4):

$\theta_3 = 60° - \theta_2$ $\qquad$ $n_3 \cdot \sin\theta_3 = n_4 \cdot \sin\theta_4$

so $\theta_4 = \sin^{-1}\left(\frac{n_3 \cdot \sin(60° - \theta_2)}{n_4}\right)$

For violet:

$\theta_2 = 27.5°$
$n_3 = 1.666$
$n_4 = 1.00$

$$\theta_4 = \sin^{-1}\left(\frac{(1.666)\sin(60° - 27.5°)}{(1.00)}\right)$$

$$\theta_{4\text{-violet}} = 63.17°$$

For red:

$\theta_2 = 28.2°$
$n_3 = 1.62$
$n_4 = 1.00$

$$\theta_4 = \sin^{-1}\left(\frac{(1.62)\sin(60° - 28.2°)}{(1.00)}\right)$$

$$\theta_{4\text{-red}} = 58.56°$$

$$\Delta\theta = \theta_{4\text{-violet}} - \theta_{4\text{-red}}$$
$$= 63.17° - 58.56°$$

$$\boxed{\Delta\theta = 4.61°}$$