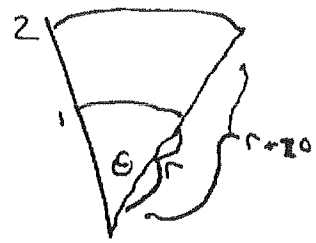
CDT Lucas Enloe



For every arc:

$$l_1 = 2\pi r \cdot \frac{\theta}{360}$$

$$l_2 = 2\pi(r+20) \cdot \frac{\theta}{360}$$

$$\Delta l = 2\pi(r+20) \cdot \frac{\theta}{360} - 2\pi r \cdot \frac{\theta}{360} = \frac{40\pi\theta}{360}$$

Total Δl:

$$\frac{40\pi\theta_1}{360} + \frac{40\pi\theta_2}{360} + \frac{40\pi\theta_3}{360} + \frac{40\pi\theta_4}{360}$$

$$= \frac{40\pi}{360}(\theta_1 + \theta_2 + \theta_3 + \theta_4)$$

Because the road goes from N to W,

$$\theta_1 + \theta_2 + \theta_3 + \theta_4 = 90^\circ$$

$$= \frac{40\pi}{360}(90) = \underline{\underline{10\pi}}$$

ANS