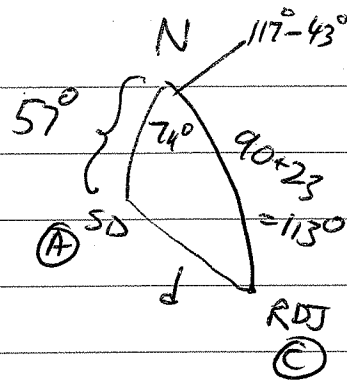


① Let d = the distance from San Diego to Rio.

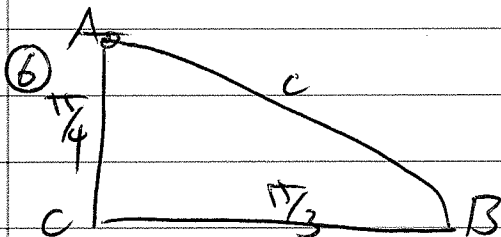
Then $d = 4000\theta$ where $\theta =$ the measure of the side AC of triangle ANC.



$$\begin{aligned} \cos \theta &= \cos 57 \cos 113 + \sin 57 \sin 113 \cos 74 \\ &= (0.544)(-0.391) + (0.838)(0.421)(0.276) \\ &= -1.5 \times 10^{-5} \end{aligned}$$

$$\Rightarrow \theta \neq \frac{\pi}{2}$$

$$\Rightarrow d = 6,283 \text{ mi}$$



$$\begin{aligned} \cos c &= \cos \frac{\pi}{4} \cos \frac{\pi}{3} = \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{1}{2\sqrt{2}} \\ &\approx 0.354 \end{aligned}$$

$$\Rightarrow c = 1.2 \text{ radians}$$

$$\sin A = \frac{\sin \frac{\pi}{3}}{\sin c} = \frac{\frac{\sqrt{3}}{2}}{\sqrt{1 - \cos^2 c}} = \frac{\frac{\sqrt{3}}{2}}{\sqrt{1 - \frac{1}{8}}} = \frac{\sqrt{3}}{2} \cdot \frac{2\sqrt{2}}{\sqrt{7}} = \frac{\sqrt{6}}{\sqrt{7}}$$

$$\approx 0.926$$

$$\cos B = \frac{\tan \frac{\pi}{3}}{\tan c} = \sqrt{3} \frac{\cos c}{\sin c} = \sqrt{3} \cdot \frac{1}{2\sqrt{2}} = \sqrt{3} \cdot \frac{1}{\sqrt{7}} = \sqrt{\frac{3}{7}} \approx 0.656$$