Exercise 227

Use a calculator to evaluate $\tan^{-1}(\tan(2.1))$ and $\cos^{-1}(\cos(2.1))$. Explain the results of each.

Solution

Plug $\tan^{-1}(\tan(2.1))$ and $\cos^{-1}(\cos(2.1))$ into the calculator.

$$\tan^{-1}(\tan(2.1)) \approx -1.04$$

$$\cos^{-1}(\cos(2.1)) = 2.1$$

The range of arccosine is between 0 and $\pi \approx 3.14$, whereas the range of arctangent is $-\pi/2$ to $\pi/2$. Since 2.1 is within 0 and π, $\cos^{-1}(\cos(2.1))$ returns 2.1. However, 2.1 is not within $-\pi/2$ to $\pi/2$, so the arctangent returns -1.04. π needs to be added to -1.04 to get back 2.1.