Exercise 214

For the following exercises, evaluate the functions. Give the exact value.

$$\sin^{-1}\left(\sin\left(\frac{\pi}{3}\right)\right)$$

Solution

Take the sine of $\pi/3$.

$$\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

So the aim is to find

$$\sin^{-1}\left(\frac{\sqrt{3}}{2}\right).$$

The inverse sine gives an angle between $-\pi/2$ and $\pi/2$.

$$x = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

$$\sin x = \frac{\sqrt{3}}{2}$$

The value of x that satisfies this equation is $\pi/3$. Therefore,

$$\sin^{-1}\left(\sin\left(\frac{\pi}{3}\right)\right) = \frac{\pi}{3}.$$