

Let  $\sin x = 0.93$  and  $\cos y = 0.29$ . Which is  $x + y$ ?

**Solution.**

Consider  $\sin x = 0.93$ . Take the inverse sine of both sides:

$$x = (-1)^n \sin^{-1} 0.93 + \pi n$$

Then

$$x_1 = \sin^{-1} 0.93 + 2\pi n, \quad n \in \mathbb{Z}$$

$$x_2 = \pi - \sin^{-1} 0.93 + 2\pi n, \quad n \in \mathbb{Z}$$

Consider  $\cos y = 0.29$ . Take the inverse cosine of both sides:

$$y = \pm \cos^{-1} 0.29 + 2\pi n, \quad n \in \mathbb{Z}$$

Then

$$y_1 = \cos^{-1} 0.29 + 2\pi n, \quad n \in \mathbb{Z}$$

$$y_2 = -\cos^{-1} 0.29 + 2\pi n, \quad n \in \mathbb{Z}$$

Consider  $x$  and  $y$  on the interval  $[0, 2\pi]$ . So

$$x + y = \sin^{-1} 0.93 \pm \cos^{-1} 0.29 \quad \text{or} \quad x + y = \pi - \sin^{-1} 0.93 \pm \cos^{-1} 0.29$$

**Answer:**

$$x + y = \sin^{-1} 0.93 \pm \cos^{-1} 0.29 \quad \text{or} \quad x + y = \pi - \sin^{-1} 0.93 \pm \cos^{-1} 0.29$$