

Calculus I Section 1-5: Solving Trig Equations with Calculators II

Question 10

Solve the equation

$$\sin(x) + \cos(x) = 1.2$$

for all $x \in [0, 2\pi]$, rounding your answers to two decimal places.

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Question 10 - Solution

Use

$$\sin x + \cos x = \sqrt{2} \sin(x + \pi/4).$$

Let $\alpha = \arcsin(1.2/\sqrt{2})$. The two solution families are

$$x = \alpha - \pi/4 + 2k\pi, \quad x = 3\pi/4 - \alpha + 2k\pi.$$

Only $k = 0$ gives values in $[0, 2\pi]$, hence

$$\boxed{x \approx 0.23, 1.34}.$$

Both satisfy the unsquared equation; adding π reverses the sign and does not give another solution.