

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

Question 9

Solve the equation

$$\tan(x) + 2 = 1.5$$

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

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Question 9 - Solution

Step 1: Isolate the trigonometric function. The equation becomes

$$\tan(1x) = -0.5, \quad u = 1x, \quad 0 \leq u \leq 2\pi.$$

Let $\alpha = \arctan(-0.5)$. All solutions are

$$u = \alpha + k\pi, \quad k \in \mathbb{Z}.$$

Step 2: Restrict and convert. Keep precisely the values of u in $[0, 2\pi]$ and divide by 1. Evaluating the inverse function at full precision and rounding only the final values gives

$$x \approx 2.68, 5.82.$$

These are all 2 solutions in the stated interval, in radians. Substitution of the unrounded values verifies the original equation.