

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

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### Question 2

Solve the equation

$$\sin(2x) = 0.6$$

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

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### Question 2 - Solution

**Step 1: Isolate the trigonometric function.** The equation becomes

$$\sin(2x) = 0.6, \quad u = 2x, \quad 0 \leq u \leq 4\pi.$$

Let  $\alpha = \arcsin(0.6)$ . All solutions are

$$u = \alpha + 2k\pi \quad \text{or} \quad u = \pi - \alpha + 2k\pi, \quad k \in \mathbb{Z}.$$

**Step 2: Restrict and convert.** Keep precisely the values of  $u$  in  $[0, 4\pi]$  and divide by 2. Evaluating the inverse function at full precision and rounding only the final values gives

$$x \approx 0.32, 1.25, 3.46, 4.39.$$

These are all 4 solutions in the stated interval, in radians. Substitution of the unrounded values verifies the original equation.