

### Question 1

Solve the equation

$$\sin(x) = 0.65$$

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

## Question 1 - Solution

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

$$\sin(1x) = 0.65, \quad u = 1x, \quad 0 \leq u \leq 2\pi.$$

Let  $\alpha = \arcsin(0.65)$ . 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  $[0, 2\pi]$  and divide by 1. Evaluating the inverse function at full precision and rounding only the final values gives

$$x \approx 0.71, 2.43.$$

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