Complex roots of unity & polynomial equations

Exercise 3.10

Find all solutions to the equation $z^5 = 2 - 2i$, rounded to three digits.

Solution Exercise 3.10

$$
\begin{aligned}
z^5 &= 2 - 2i \\
z^5 &= \sqrt{8} e^{-\frac{3}{4}\pi i + k2\pi i} \\
z &= 8^{\frac{1}{10}} e^{-\frac{3}{20}\pi i + k\frac{2}{5}\pi i} \\
z &= -0.870 + 0.870i \\
\vee\, z &= 0.192 - 1.216i \\
\vee\, z &= 0.559 + 1.097i \\
\vee\, z &= 1.216 - 0.192i \\
\vee\, z &= -1.097 - 0.559i
\end{aligned}
$$