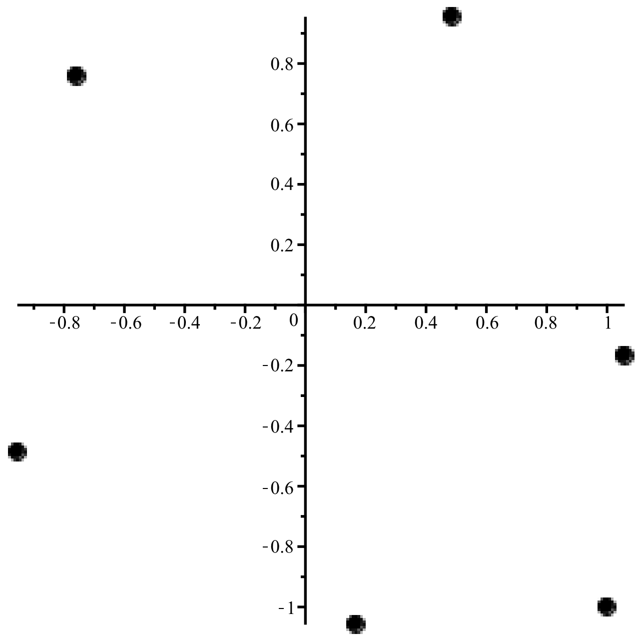
$with(plots):$

$$pointplot\left(\left[\left[2^{\frac{1}{10}}\cos\left(\frac{7\cdot \mathrm{Pi}}{20}\right), 2^{\frac{1}{10}}\sin\left(\frac{7\cdot \mathrm{Pi}}{20}\right)\right], \left[2^{\frac{1}{10}}\cos\left(\frac{3\cdot \mathrm{Pi}}{4}\right), 2^{\frac{1}{10}}\sin\left(\frac{3\cdot \mathrm{Pi}}{4}\right)\right], \left[2^{\frac{1}{10}}\cos\left(\frac{23\cdot \mathrm{Pi}}{20}\right), 2^{\frac{1}{10}}\sin\left(\frac{23\cdot \mathrm{Pi}}{20}\right)\right], \left[2^{\frac{1}{10}}\cos\left(\frac{31\cdot \mathrm{Pi}}{20}\right), 2^{\frac{1}{10}}\sin\left(\frac{31\cdot \mathrm{Pi}}{20}\right)\right], \left[2^{\frac{1}{10}}\cos\left(\frac{39\cdot \mathrm{Pi}}{20}\right), 2^{\frac{1}{10}}\sin\left(\frac{39\cdot \mathrm{Pi}}{20}\right)\right], \left[\mathrm{sqrt}(2)\cdot\cos\left(\frac{7\,\mathrm{Pi}}{4}\right), \mathrm{sqrt}(2)\cdot\sin\left(\frac{7\,\mathrm{Pi}}{4}\right)\right]\right], symbol = solidcircle, symbolsize = 20\right)$$



$$evalf\left(2^{\frac{1}{10}}\right)$$

$$1.071773463 \tag{1}$$

$$evalf\left(2^{\frac{1}{2}}\right)$$

$$1.414213562 \tag{2}$$

Let's do this with a similar complex number, but one that's got greater length, so the length difference between z and its roots will be more pronounced. The original question had an absolute value (or modulus) of $\sqrt{2}$. Here's the same one, but with a modulus of $\sqrt{10}$. The point in the lower right corner is z and all the other points are the 5th roots of z.

$$pointplot\left(\left[\left[10^{\frac{1}{10}}\cos\left(\frac{7\cdot \mathrm{Pi}}{20}\right), 10^{\frac{1}{10}}\sin\left(\frac{7\cdot \mathrm{Pi}}{20}\right)\right], \left[10^{\frac{1}{10}}\cos\left(\frac{3\cdot \mathrm{Pi}}{4}\right), 10^{\frac{1}{10}}\sin\left(\frac{3\cdot \mathrm{Pi}}{4}\right)\right], \left[10^{\frac{1}{10}}\cos\left(\frac{23\cdot \mathrm{Pi}}{20}\right), 10^{\frac{1}{10}}\sin\left(\frac{23\cdot \mathrm{Pi}}{20}\right)\right], \left[10^{\frac{1}{10}}\cos\left(\frac{31\cdot \mathrm{Pi}}{20}\right), 10^{\frac{1}{10}}\sin\left(\frac{31\cdot \mathrm{Pi}}{20}\right)\right],\right.$$

$$\left[10^{\frac{1}{10}}\cos\left(\frac{39\cdot \mathrm{Pi}}{20}\right), 10^{\frac{1}{10}}\sin\left(\frac{39\cdot \mathrm{Pi}}{20}\right)\right], \left[\mathrm{sqrt}(10)\cdot\cos\left(\frac{7\,\mathrm{Pi}}{4}\right), \mathrm{sqrt}(10)\cdot\sin\left(\frac{7\,\mathrm{Pi}}{4}\right)\right]\Bigg], \mathit{symbol} = \mathit{solidcircle}, \mathit{symbolsize} = 20\Bigg)$$