

Evaluate to either rectangular or polar form:

$$z = i^3$$

$$z = (2 + i)^2$$

$$z = (1 - i)^{-1}$$

$$z = (1 - i)^{-2}$$

$$z = \sqrt{4}$$

$$z = \sqrt{1 - i}$$

$$z = \sqrt[3]{4}$$

$$z = \sqrt[5]{3-i}$$

$$z = 4^i$$

$$z = (4 - i)^i$$

$$z = (4 - i)^{2+i}$$

$$z = \sqrt[1+i]{4 - i}$$

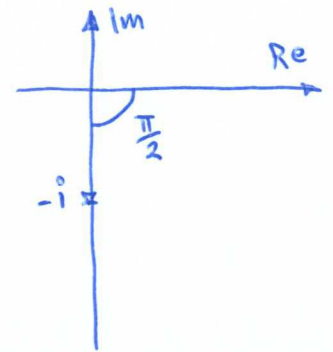
Evaluate to either rectangular or polar form:

$$z = i^3$$

$$= i^2 i$$

$$= -i$$

$$\begin{aligned} Z &= 0 - i = e^{-\frac{\pi}{2}i} \\ &= e^{-1.571i} \end{aligned}$$



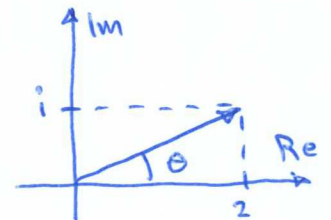
$$z = (2 + i)^2$$

$$= (\sqrt{5} e^{0.464i})^2$$

$$= (\sqrt{5})^2 e^{2(0.464i)}$$

$$= 5e^{0.927i}$$

$$\overset{\text{use}}{e^{i\theta} = \cos(\theta) + i\sin(\theta)}$$



$$\begin{aligned} \theta &= \tan^{-1}\left(\frac{1}{2}\right) \approx 0.464 \\ R &= \sqrt{2^2 + 1^2} = \sqrt{5} \end{aligned}$$

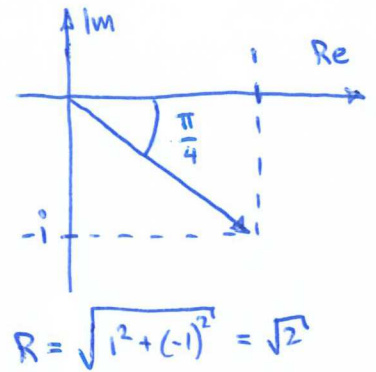
$$\begin{aligned} Z &= 5e^{0.927i} = 5\cos(0.927) + i5\sin(0.927) \\ &= 3 + 4i \end{aligned}$$

$$z = (1 - i)^{-1}$$

$$= (\sqrt{2} e^{-\frac{\pi}{4}i})^{-1}$$

$$= \sqrt{2}^{-1} e^{+\frac{\pi}{4}i}$$

$$= \frac{1}{\sqrt{2}} e^{\frac{\pi}{4}i}$$



$$z = \frac{1}{\sqrt{2}} e^{\frac{\pi}{4}i} = 0.707 e^{0.785i}$$

$$= 0.707 \cos\left(\frac{\pi}{4}\right) + 0.707i \sin\left(\frac{\pi}{4}\right)$$

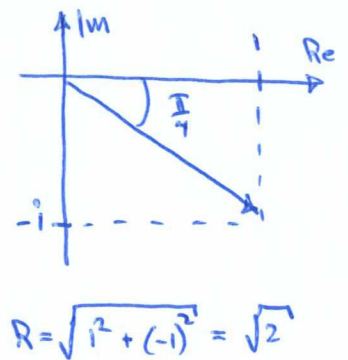
$$= 0.5 + 0.5i$$

$$z = (1 - i)^{-2}$$

$$= (\sqrt{2} e^{-\frac{\pi}{4}i})^{-2}$$

$$= (\sqrt{2})^{-2} e^{+\frac{\pi}{2}i}$$

$$= \frac{1}{2} e^{\frac{\pi}{2}i}$$



$$z = \frac{1}{2} e^{\frac{\pi}{2}i} = \frac{1}{2} e^{1.571i}$$

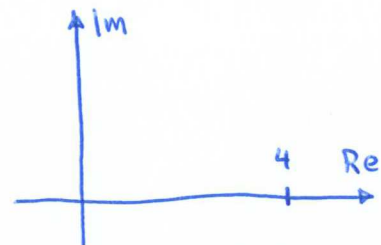
$$= \frac{1}{2} \cos\left(\frac{\pi}{2}\right) + \frac{1}{2}i \sin\left(\frac{\pi}{2}\right)$$

$$= 0 + \frac{1}{2}i$$

$$z = \sqrt{4}$$

$$= (4)^{\frac{1}{2}}$$

$$= (4e^{i0})^{\frac{1}{2}}$$



$$\theta = 0, R = 4$$

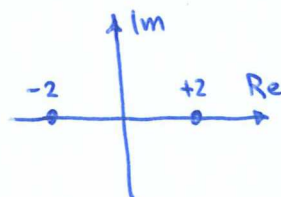
$$\theta = 0:$$

$$= 4^{\frac{1}{2}} e^{i\frac{0}{2}} = 2$$

$$\theta = 0 + 2\pi:$$

$$= 4^{\frac{1}{2}} e^{i\frac{2\pi}{2}} = 2e^{i\pi} = -2$$

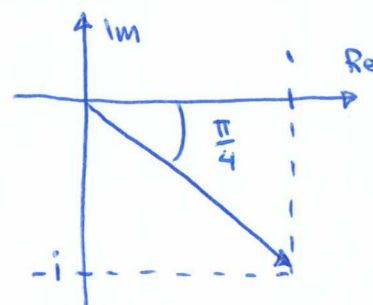
$$z = 2 \text{ or } -2$$



$$z = \sqrt{1-i}$$

$$= (1-i)^{\frac{1}{2}}$$

$$= (\sqrt{2} e^{-\frac{\pi}{4}i})^{\frac{1}{2}}$$



$$R = \sqrt{1^2 + (-1)^2} = \sqrt{2}$$

$$\theta = -\frac{\pi}{4} + 0$$

$$= \sqrt[4]{2} e^{-\frac{\pi}{8}i} = 1.10 - 0.46i$$

$$\theta = -\frac{\pi}{4} + 2\pi$$

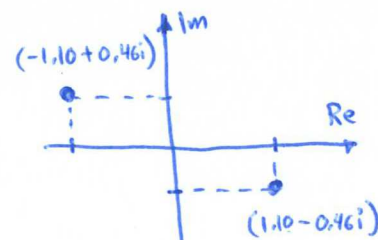
$$= \frac{7\pi}{4}$$

$$= \sqrt[4]{2} e^{\frac{7\pi}{8}i} = -1.10 + 0.46i$$

$$z = \sqrt[4]{2} e^{-\frac{\pi}{8}i} = 1.10 - 0.46i$$

or

$$z = \sqrt[4]{2} e^{\frac{7\pi}{8}i} = -1.10 + 0.46i$$



$$z = \sqrt[3]{4}$$

$$= (4e^{i0})^{\frac{1}{3}}$$

$$\theta = 0 :$$

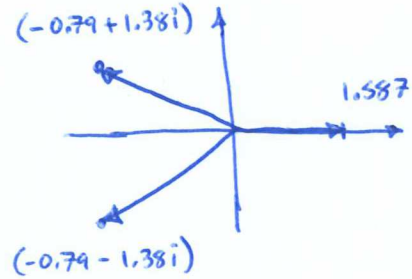
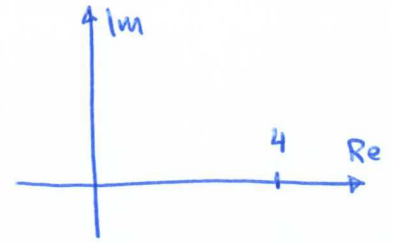
$$= 4^{\frac{1}{3}} e^{i0} = 1.587$$

$$\theta = 0 + 2\pi :$$

$$= 4^{\frac{1}{3}} e^{i\frac{2\pi}{3}} = -0.794 + 1.375i$$

$$\theta = 0 + 4\pi :$$

$$= 4^{\frac{1}{3}} e^{i\frac{4\pi}{3}} = -0.794 - 1.375i$$



$$z = \sqrt[5]{3-i}$$

$$= (\sqrt{10} e^{-0.322i})^{\frac{1}{5}}$$

$$\theta = -0.32 + 0 :$$

$$= \sqrt[5]{10} e^{-0.064i} = 1.58 - 0.10i$$

$$\theta = -0.32 + 2\pi :$$

$$= \sqrt[5]{10} e^{1.192i} = 0.59 + 1.47i$$

$$\theta = -0.32 + 4\pi :$$

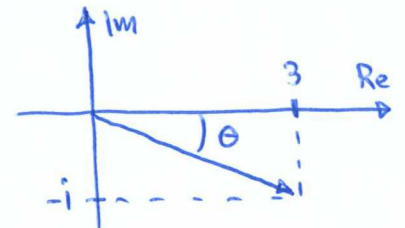
$$= \sqrt[5]{10} e^{2.449i} = -1.22 + 1.01i$$

$$\theta = -0.32 + 6\pi :$$

$$= \sqrt[5]{10} e^{3.706i} = -1.34 - 0.85i$$

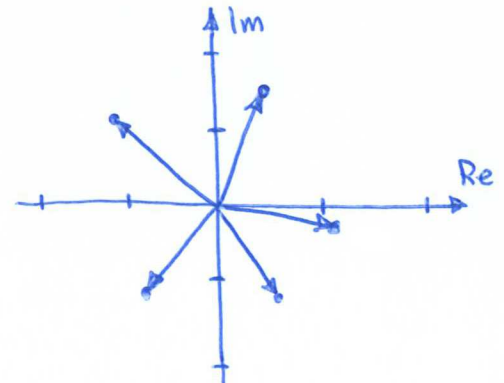
$$\theta = -0.32 + 8\pi :$$

$$= \sqrt[5]{10} e^{4.692i} = 0.39 - 1.54i$$



$$\theta = \tan^{-1}\left(\frac{1}{3}\right) = 0.322$$

$$R = \sqrt{3^2 + (-1)^2} = \sqrt{10}$$

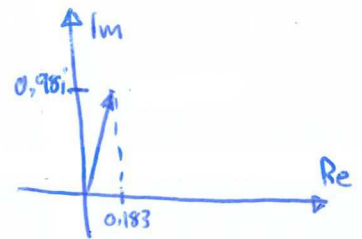


$$z = 4^i$$

$$= e^{\ln(4^i)}$$

$$= e^{i \ln(4)}$$

$$= e^{1.39i} = 0.183 + 0.983i$$



$$z = (4 - i)^i$$

$$= (\sqrt{17} e^{-0.245i})^i$$

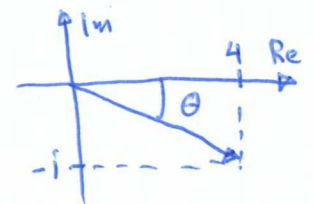
$$= 17^{\frac{i}{2}} e^{-0.245i^2}$$

$$= 17^{\frac{i}{2}} e^{0.245}$$

$$= e^{\ln(17^{\frac{i}{2}})} e^{0.245}$$

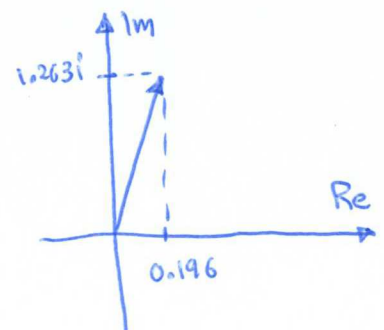
$$= e^{0.245} e^{i \frac{1}{2} \ln(17)}$$

$$= 1.278 e^{1.417i} = 0.196 + 1.263i$$



$$\theta = \tan^{-1}\left(\frac{1}{4}\right) = 0.245$$

$$R = \sqrt{4^2 + (-1)^2} = \sqrt{17}$$



$$z = (4 - i)^{2+i}$$

$$= (\sqrt{17} e^{-0.245i})^{2+i}$$

$$= (17^{\frac{1}{2}})^{2+i} e^{-0.245i(2+i)}$$

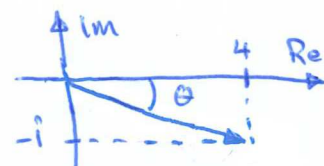
$$= (17^{\frac{1}{2}})^2 (17^{\frac{1}{2}})^i e^{-i0.49} e^{-0.245i^2}$$

$$= (17 e^{0.245}) e^{-0.49i} (17^{\frac{1}{2}})^i$$

$$= 21.72 e^{-0.49i} e^{i \ln(17^{\frac{1}{2}})}$$

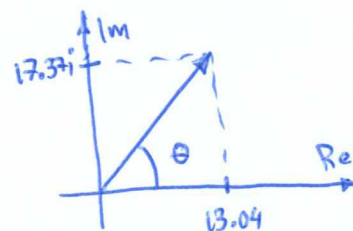
$$= 21.72 e^{i(\ln(\sqrt{17}) - 0.49)}$$

$$= 21.72 e^{0.927i} = 13.04 + 17.37i$$



$$\theta = \tan^{-1}\left(\frac{1}{4}\right) = 0.245$$

$$R = \sqrt{4^2 + (-1)^2} = \sqrt{17}$$



$$z = 1+i\sqrt{4-i}$$

$$= (\sqrt{17} e^{-0.245i})^{\frac{1}{1+i}}, \quad \frac{1}{1+i} = \frac{1}{1+i} \left(\frac{1-i}{1-i} \right)$$

$$= (\sqrt{17} e^{-0.245i})^{(0.5-0.5i)} = \frac{1-i}{1-i+i-i^2}$$

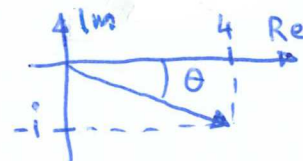
$$= (17^{\frac{1}{2}})^{0.5} (17^{\frac{1}{2}})^{-0.5i} e^{-0.245i(\frac{1}{2}-\frac{1}{2}i)} = \frac{1-i}{2}$$

$$= (17^{\frac{1}{4}} e^{0.123i}) e^{-0.123i} (17^{\frac{1}{2}})^{-\frac{1}{2}} = \frac{1}{2} - \frac{1}{2}i$$

$$= 2.296 e^{-0.123i} e^{-\frac{1}{2} \ln(17^{\frac{1}{2}})}$$

$$= 2.296 e^{-(0.123 + 0.5 \ln(\sqrt{17}))i}$$

$$= 2.29 e^{-0.831i} = 1.54 - 1.69i$$



$$\theta = \tan^{-1}\left(\frac{1}{4}\right) = 0.245$$

$$R = \sqrt{4^2 + (-1)^2} = \sqrt{17}$$

