

1) Physics 371 Math Quiz
Solutions

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$\det(A - \lambda I) = \begin{vmatrix} a - \lambda & b \\ c & d - \lambda \end{vmatrix}$$

$$= (a - \lambda)(d - \lambda) - bc$$

$$= ad - (a + d)\lambda + \lambda^2 - bc$$

$$\lambda^2 - (a + d)\lambda + ad - bc = 0$$

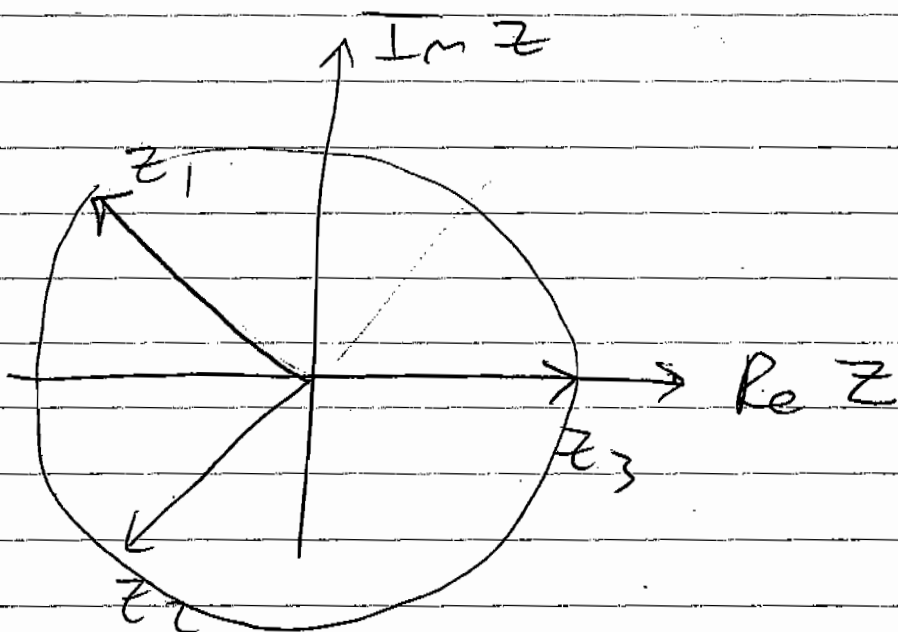
$$\lambda = \frac{a + d}{2} \pm \sqrt{\left(\frac{a + d}{2}\right)^2 - ad + bc}$$

$$\lambda = \frac{a + d}{2} \pm \sqrt{\left(\frac{a - d}{2}\right)^2 + bc}$$

$$1) \quad z^3 = 1 = e^{i2\pi n}$$

$$z = e^{i2\pi n/3}$$

$$z = \begin{cases} e^{i2\pi/3} = -\frac{1}{2} + i\frac{\sqrt{3}}{2} \\ e^{i4\pi/3} = -\frac{1}{2} - i\frac{\sqrt{3}}{2} \\ e^{i2\pi} = 1 \end{cases}$$



→) a) $\lambda < 0$ $x(t) = A \cos \sqrt{\lambda} t + B \sin \sqrt{\lambda} t$

b) $\lambda > 0$ $x(t) = A e^{\sqrt{\lambda} t} + B e^{-\sqrt{\lambda} t}$

4)

1 6

6 1

2 5

5 2

4 3

3 4

$$P = \frac{6}{36} = \frac{1}{6}$$