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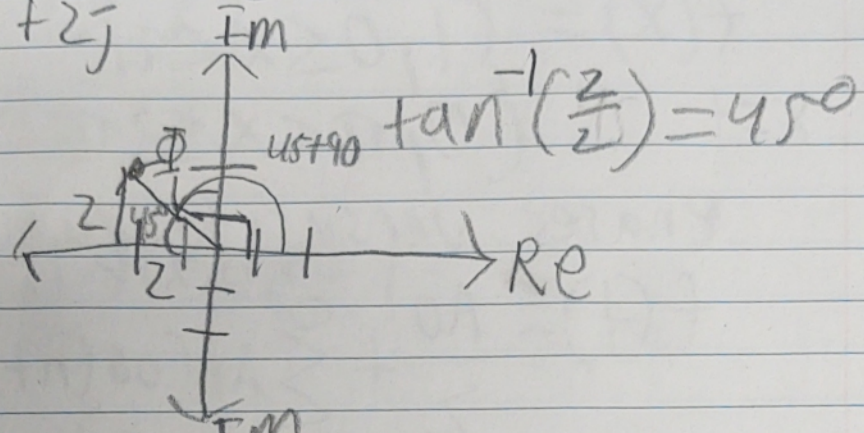
COSC 360

Quiz #2

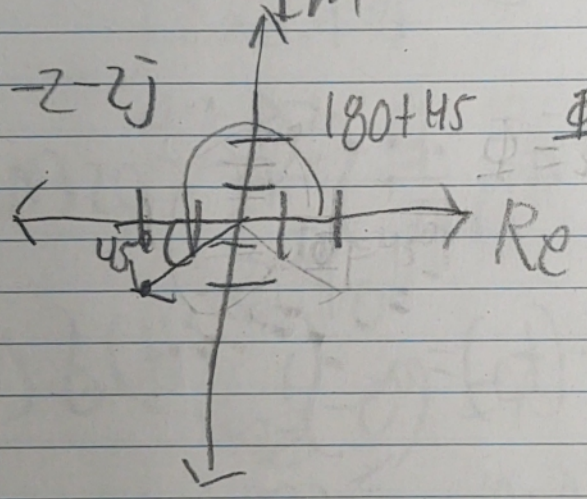
1. a. $z = -2 + 2j$



$\Phi = 135^\circ$

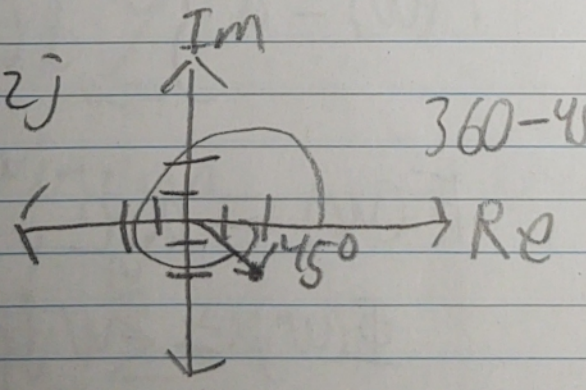
$\tan^{-1}\left(\frac{2}{2}\right) = 45^\circ$

b. $z = -2 - 2j$



$\Phi = 225^\circ$

c. $z = 2 - 2j$



$\Phi = 315^\circ$

2. $t = 0$

a. $v(t) = 4\cos(2\pi(10.0)t + 30^\circ)$

$v(0) = 4\cos(0 + 30)$

$v(0) = 4\frac{\sqrt{3}}{2}$ $v(0) \approx 3.4641016$

b. $v(t) = 2\sin(2\pi(10.0)t + -60^\circ)$ $v(0) = 2\sin(0 - 60)$ $v(0) \approx -3.4641$

3. $f(x) = \begin{cases} 1, 0 \le x < \pi \\ 0, \pi < x \le 2\pi \end{cases}$

$x = t$

Phases versus frequency

$$f(t) = \frac{A0}{2} + \sum_{n=1}^{\infty} An\cos(nt) + Bn\sin(nt)$$

$$An = \frac{1}{n}\int_0^{\infty} \pi \cos(nt)\,dt$$

$$F(to) = a\int_{-\infty}^{\infty} f(t)\,\delta(t - to)\,dt$$

$$F(w) = a\int_{-\infty}^{\infty} \delta(t - to)e^{-jwt})\,dt$$

$$F(w) = a e^{-jwto}$$

$$\Phi(w) = -w\,to$$

4. Magnitude $= 0$

$\pi < x \le 2\pi$

It is zero

Between greator than $-w\pi$ } could be equal to $-2\pi w$

5. Range $[0,1]$

$$P(X) = 2X$$

$$= \int_0^1 P(X)\,dx = 1$$

$$= \int_0^1 2x\,dx = 1$$

$$= 2\left(\frac{x^2}{2}\Big|_0^1\right) = 1$$

$$= 2\left(\frac{1}{2} - \frac{0}{2}\right) = 1$$

$$1 = 1 \checkmark$$

6. find the mean $\{0,1\}$

$$M = \frac{1}{N}\sum_{i=1}^{N} 2x_i$$

$$M = \frac{1}{2}\sum_{i=1}^{2} 2x_i$$

$$M = \frac{1}{2}(2(0) + 2(1))$$

$$M = 1$$

7. $\sqrt{\sigma^2} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - M)^2}$

$$\sigma = \sqrt{\frac{1}{1}\sum_{i=1}^{2}(x_i - 1)^2}$$

$$\sigma = \sqrt{(0)^2 + (1)^2}$$

$$\sigma = \sqrt{1}$$

$$\sigma = 1$$