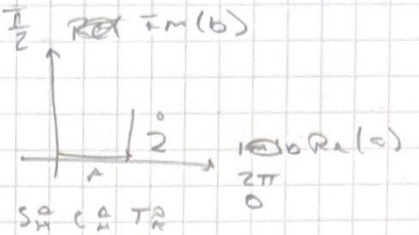
① $z = a + jb$

(a) -2



① $r = \sqrt{a^2 + b^2}$

$\sqrt{-2^2} = \sqrt{4} = 2$

$\tan(0/2) = 0$

$e^{j\theta} =$ 0 or 2π

Polar $(2, 0)$

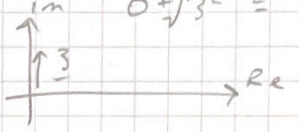
(b) $j(1+j)$ $\quad j + 2j = 3j$

$a + jb$

$= 0 + 3j$

① $r = \sqrt{a^2 + b^2}$

$0 + \sqrt{3^2} = 3$



$\cos\left(\frac{\pi}{2}\right) + j\sin\left(\frac{\pi}{2}\right) = e^{j\frac{\pi}{2}}$

Polar : $\left(\frac{\pi}{2}, 3\right)$ Angle $= \frac{\pi}{2}$, magnitude $= 3$

② $x(t) = 0 + 2\left(u - \frac{1}{2}\right)$

$x(t) = 0 + 2\left(u - \frac{1}{2}\right)t$

$(-\infty \to 0) \; ; \; 2(0, 2) \; ; \; (2 \to \infty)$

$r \neq 1 = \frac{a - ar^n}{1 - r}$

③ $\sum_{n=0}^{14} e^{j\frac{2\pi n}{6}} \to \sum_{n=0}^{14} \frac{e^{j\frac{2\pi n}{6}} + e^{-j\frac{2\pi n}{6}}}{6}$

$\to \frac{1}{6}\left(\cos\frac{2\pi n}{6} + j\sin\frac{2\pi n}{6}\right) + \left(\cos\frac{2\pi n}{6} - j\sin\frac{2\pi n}{6}\right)$

$a = 1 + 0 = 1$

$r = \frac{1}{2} + \frac{\sqrt{3}}{2}j$

$\frac{1 - 1\left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)^{14}}{1 - \left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)}$

$\frac{1}{\frac{1}{2} - \frac{\sqrt{3}j}{2}}$

$\frac{1 - 1\left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)^{14}}{1 - \frac{1}{2} + \frac{\sqrt{3}}{2}j}$

Answer

$$\frac{1}{6}\left(\frac{1 - 1\left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)^{14}}{1 - \left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)} + \frac{1 - 1\left(\frac{1}{2} + \frac{\sqrt{3}}{2}j\right)^{14}}{1 - \left(\frac{1}{2} - \frac{\sqrt{3}}{2}j\right)}\right)$$