Q: What is the instantaneous power

of $x(t) = |c| e^{\sigma t} e^{j(\omega t + \phi)}$

Ans:

* CT harmonically related complex exponentials
(HRCEs)
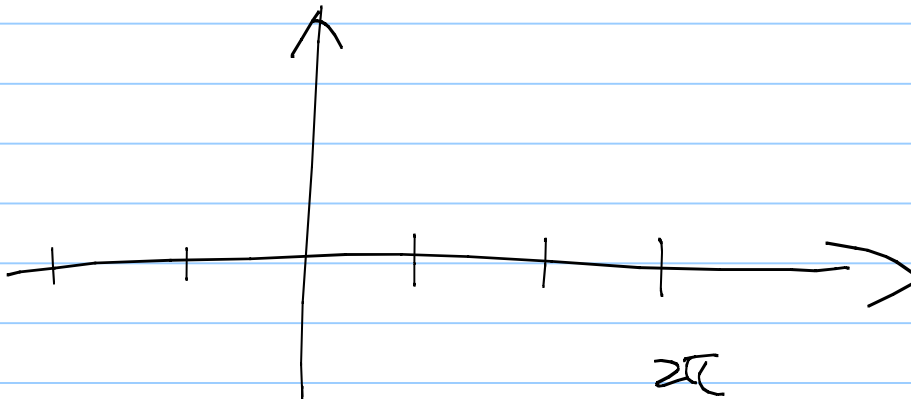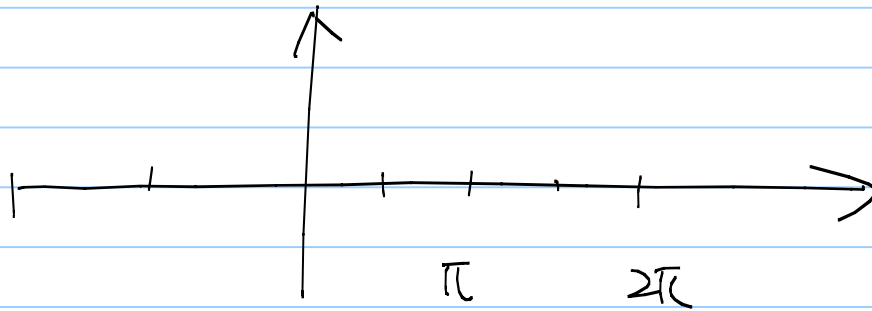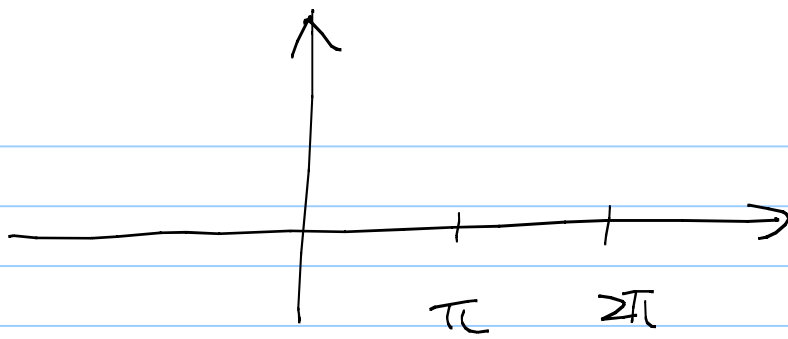
— For any ω, how many CT HRCEs
do we have?
Ans:

— All these signals are periodic

— Their fundamental freq are _____
fundamental periods are _____

π 2π

π 2π

2π

— The name "harmonic" follows from music.

⨳ DT Complex Exponential

$$x[n] =$$

To study this signal, rewrite

$$\Rightarrow x[n] =$$

Term 1: Amplitude Scaling

Term 2: If $\sigma > 0$

If $\sigma < 0$ If $\sigma = 0$

Term 3: $e^{j(\omega n + \phi)}$

Real $(e^{j(\omega n + \phi)})$

Again we rely on continuous signals to help us plot the DT signals.

When we combine them together
Real $(e^{j\omega n})$