Plot $y(t) = \frac{1}{3} x(4 - 0.5t)$.

Ans:

Prof. Balakrishnan's handout.

* Classification #3: By the period.

* We say $x(t)$ is a periodic signal with **period T** if we let $y(t) = x(t-T)$ be the shifted version of $x(t)$, then the new signal "looks" exactly like the old signal: sometimes we just write

For DT:

Ex: $x(t) = \sin(2t)$ Plot $x(t)$ vs. t.

Ex: $x[n] = (-1)^n$

Q: Is $x[n]$ periodic?

A:

* If $x(t)$ is periodic with period T then it is periodic with period mT for any $m \geq 1$ integers

Ex: $\pi, 2\pi, 3\pi, \cdots$ are all periods for $x(t) = \sin(2t)$

* Def: The <u>fundamental period</u> is the smallest period of a periodic signal $x(t)$ or $x[n]$.

* If $x(t) = x_{Re}(t) + j\,x_{Im}(t)$ is a periodic complex signal, then both $x_{Re}(t)$ & $x_{Im}(t)$ are <u>periodic</u> real signals.

Proof:

Question If both $x_1(t)$ and $x_2(t)$ are periodic, must $x_1(t)+x_2(t)$ periodic?

How to decide the period of a signal?

Ans: