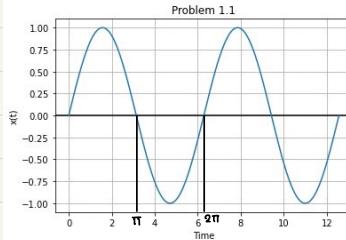
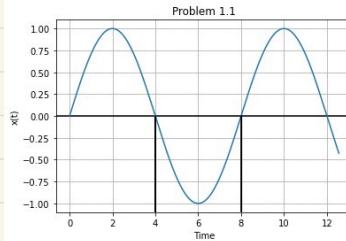
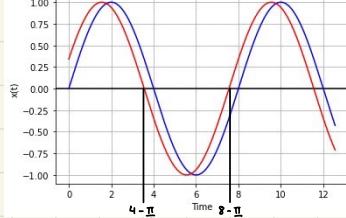
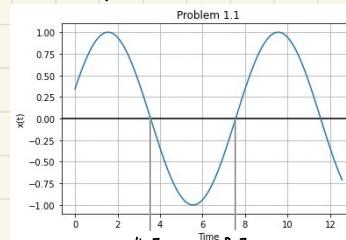


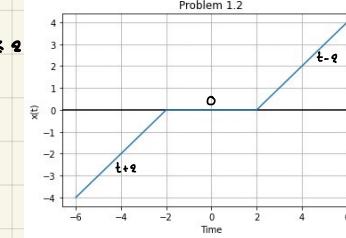
## Problem 1

$$1) x(t) = \sin\left(\frac{\pi}{4}t + 20^\circ\right)$$

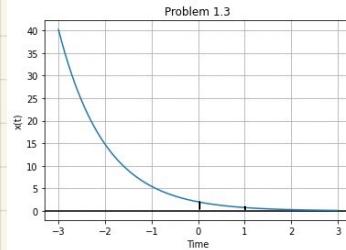
ඇගගතාප්‍ර ස්ථිරයක්

තාකාර්ය scale 1ව  $\frac{\pi}{4}$  යොදැටා  $T' = 8\pi/\pi/4 = 8$ තාකාර්ය shift 4ව  $-20^\circ$  :තෙව්ත් ඇගගතාප්‍ර  $x(t) = \sin\left(\frac{\pi}{4}t + 20^\circ\right)$  ස්ථිරය

$$2) x(t) = \begin{cases} t+2, & t \leq -2 \\ 0, & -2 < t \leq 2 \\ t-2, & t > 2 \end{cases}$$

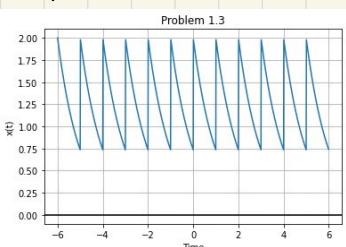


$$3) x(t) = 2e^{-t}, 0 < t < 1 \text{ and } x(t+1) = x(t) \text{ for all } t$$

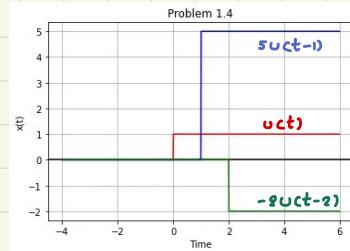
ඇගගතාප්‍ර  $2e^{-t}$  ස්ථිරය

ප්‍රේට්‍රෝනියා = ජ්‍යෙෂ්ඨ තේම් මාන්‍යාධ්‍ය පරිඛිඥ

$$\text{ඇගගතාප්‍ර } x(t) = 2e^{-t}, 0 < t < 1 \text{ and } x(t+1) = x(t) \text{ for all } t :$$

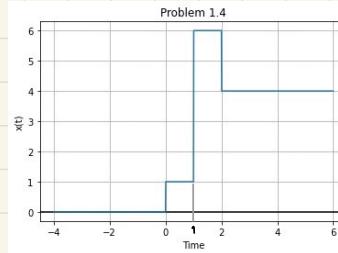


$$4) x(t) = u(t) + 5u(t-1) - 2u(t-2)$$

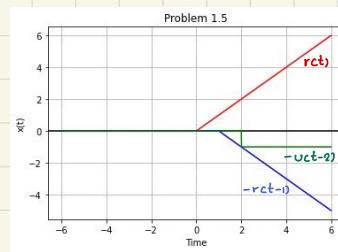
ඇගගතාප්‍ර  $u(t)$ ,  $5u(t-1)$ ,  $-2u(t-2)$  ස්ථිරය

තෙකාර්යක් 3 ප්‍ර ප්‍ර ප්‍ර

$$\text{ඇගගතාප්‍ර } x(t) = u(t) + 5u(t-1) - 2u(t-2) \text{ ස්ථිරය}$$

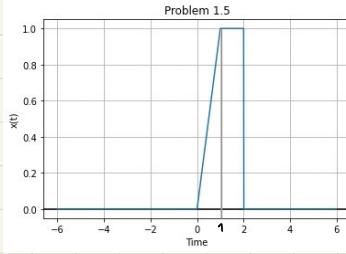


$$5) x(t) = rct) - rct-1) - uct-2)$$

ඇගගතාප්‍ර  $rct)$ ,  $-rct-1)$ ,  $-uct-2)$  ස්ථිරය

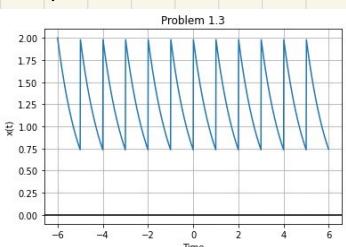
තෙකාර්යක් 3 ප්‍ර ප්‍ර ප්‍ර

$$\text{ඇගගතාප්‍ර } x(t) = rct) - rct-1) - uct-2) \text{ ස්ථිරය}$$



ප්‍රේට්‍රෝනියා = ජ්‍යෙෂ්ඨ තේම් මාන්‍යාධ්‍ය පරිඛිඥ

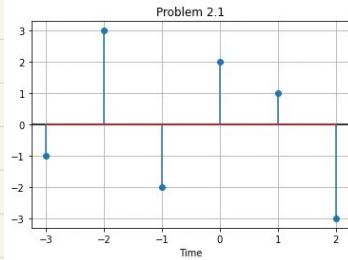
$$\text{ඇගගතාප්‍ර } x(t) = 2e^{-t}, 0 < t < 1 \text{ and } x(t+1) = x(t) \text{ for all } t :$$



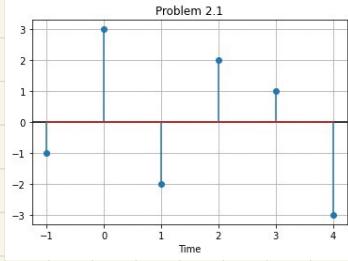
Problem 4

1)  $x[-n]$

ක්‍රියාවලි  $x[-n]$  :

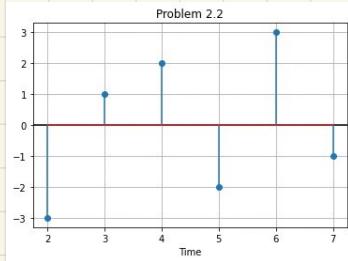


ක්‍රියාවලි  $x[-n]$  යුතු වූ නැත්  $x[-cn-n] = x[-n]$  :

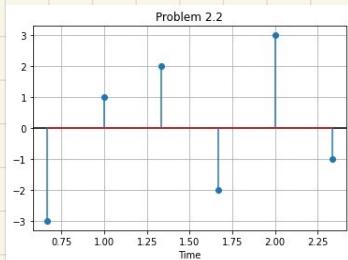


2)  $x[3n-4]$

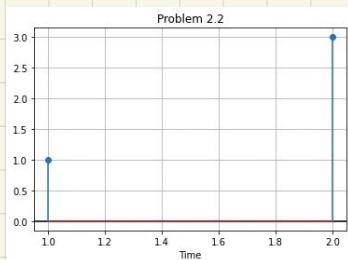
ක්‍රියාවලි  $x[n]$  යුතු වූ නැත්  $x[n-4]$



ක්‍රියාවලි  $x[n-4]$  මෙහේ වූ නැත්  $x[3n-4]$

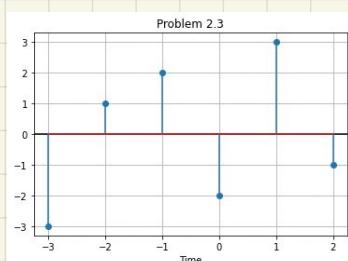


ක්‍රියාවලි  $x[3n-4]$  මෙහේ වූ නැත්  $x[n-4]$  එවා



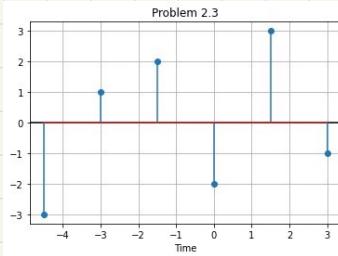
3)  $x[\frac{2}{3}n+1]$

ක්‍රියාවලි  $x[n]$  යුතු වූ නැත්  $x[n+1]$

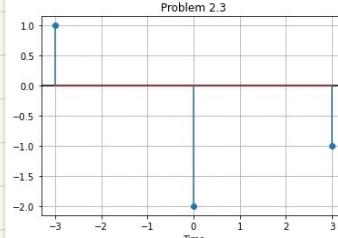


[තට ආපසුණුවා]

ක්‍රියාවලි  $x[n+1]$  මෙහේ වූ නැත්  $x[\frac{2}{3}n+1]$

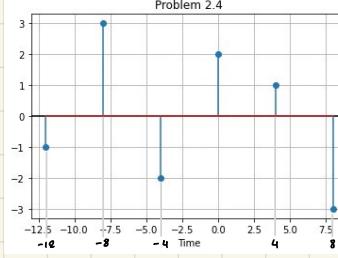


ක්‍රියාවලි  $x[n+1]$  මෙහේ වූ නැත්  $x[\frac{2}{3}n+1]$  එවා

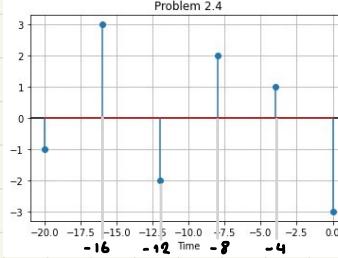


4)  $x[-\frac{n+8}{4}]$

ක්‍රියාවලි  $x[n]$  මෙහේ 1 ක්‍රියාවලි  $x[n+1]$  මෙහේ  $\frac{1}{4}$  වූ නැත්  $x[-\frac{n}{4}]$



ක්‍රියාවලි  $x[-\frac{n}{4}]$  මෙහේ -8 වූ නැත්  $x[-\frac{n+8}{4}]$  එවා



5)  $x[n^3]$

ඇග : : : : :

$$n = -2 \text{ නැත් } n^3 = -8 \rightarrow x[n^3] \text{ තුළු ගැනීමෙන් නිස් නිස් }$$

$$n = -1 \text{ නැත් } n^3 = -1 \rightarrow x[n^3] = 1$$

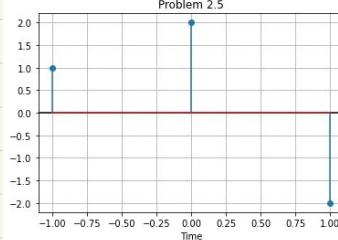
$$n = 0 \text{ නැත් } n^3 = 0 \rightarrow x[n^3] = 0$$

$$n = 1 \text{ නැත් } n^3 = 1 \rightarrow x[n^3] = -1$$

$$n = 2 \text{ නැත් } n^3 = 8 \rightarrow x[n^3] \text{ තුළු ගැනීමෙන් නිස් }$$

⋮ ⋮ ⋮ ⋮ ⋮ ⋮

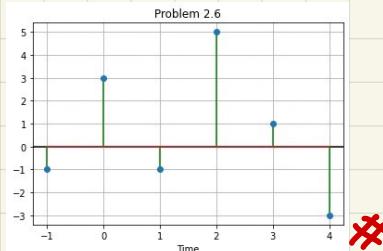
තුළු රෝ ප්‍රෙශන ප්‍රෙශන  $x[n^3]$  එවා



☒

$$6) \times [z-n] + x[zn-4]$$

ඇගතාප්‍රත්‍රි 1), 2) පාත්‍රතාවයෙහි  $\times [z-n] + x[zn-4]$  එම



### Problem 9

$$1) \int_{-\infty}^{\infty} \left( \frac{2}{3} t - \frac{3}{2} \right) \delta(t-1) dt = \frac{2}{3}(1) - \frac{3}{2} = -\frac{5}{6} \quad (\text{sifting property})$$

$$2) \int_{-\infty}^{\infty} (t-1) \delta\left(\frac{2}{3} t - \frac{3}{2}\right) dt = \frac{3}{2} \int_{-\infty}^{\infty} (t-1) \delta\left(t - \frac{9}{4}\right) dt \quad (\text{scaling property})$$

$$= \frac{3}{2} \left( \frac{9}{4} - 1 \right) = \frac{15}{8} \quad (\text{sifting property})$$

$$3) \int_{-3}^{-2} [e^{t-t+1} + \sin(\frac{2\pi t}{3})] \delta(t - \frac{3}{2}) dt$$

යේටුවනා  $\frac{3}{2} > -2$  නීතියෙන්  $\int_{-3}^{-2} [e^{t-t+1} + \sin(\frac{2\pi t}{3})] \delta(t - \frac{3}{2}) dt = 0$

$$4) \int_{-3}^{-2} [e^{t-t+1} + \sin(\frac{2\pi t}{3})] \delta(t - \frac{3}{2}) dt = (e^{-\frac{3}{2}+1}) + \sin\left(\frac{2\pi(-\frac{3}{2})}{3}\right) \quad (\text{sifting property})$$

$$= e^{-1/2} + \sin \pi = e^{-1/2}$$