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Bsee 19047

Sygnals & Systems

Assignment 1

Q:-1

$$x(t) = 2\cos(10t+1) - \sin(4t-1)$$

Period of $\cos x$ and $\sin x = 2\pi$

$\cos(10t+1) = \frac{2\pi}{10}$, $\sin(4t-1) = \frac{2\pi}{4}$

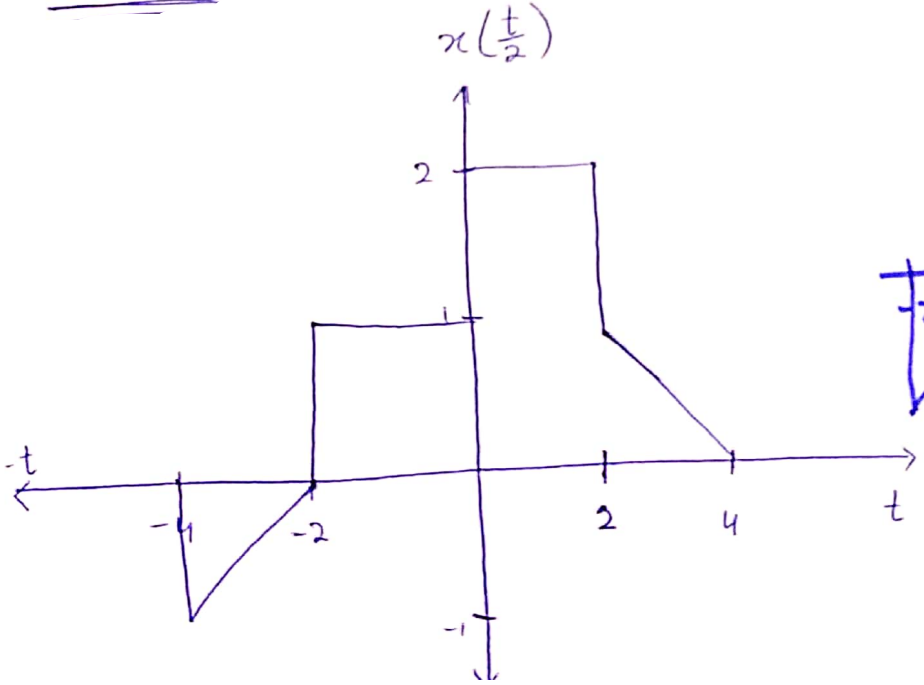
$= \frac{\pi}{5}$, $= \frac{\pi}{2}$

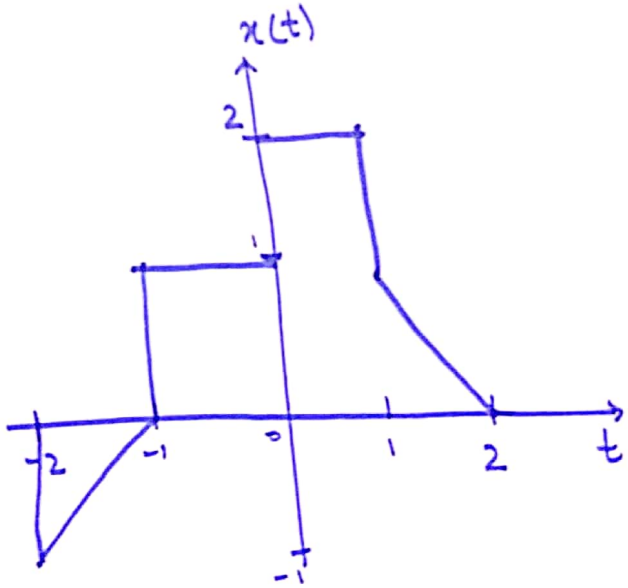
LCM of $\frac{\pi}{5}$ and $\frac{\pi}{2} = \frac{2\pi}{10} + \frac{5\pi}{10} = \frac{7\pi}{10}$

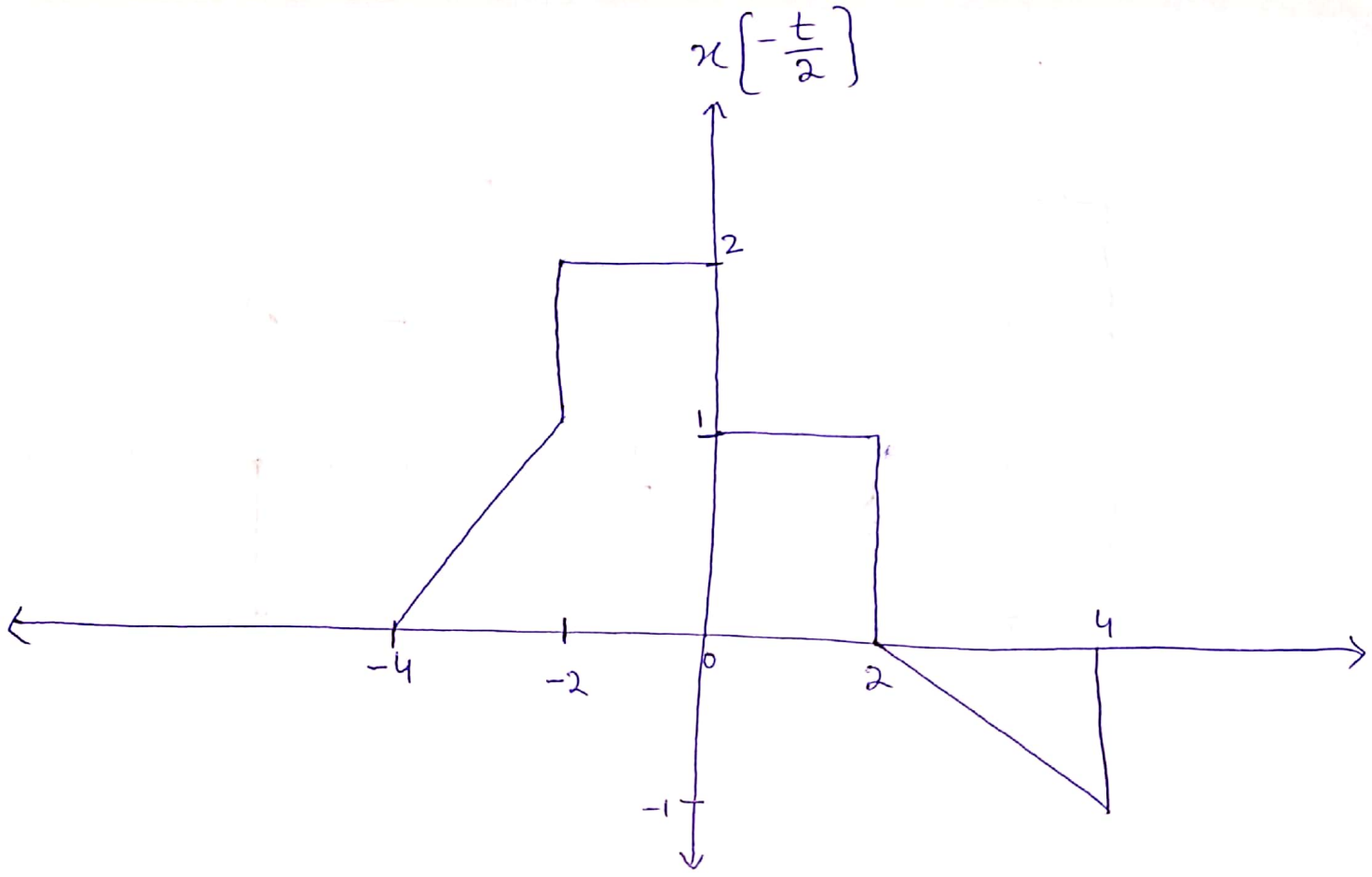
Here $pi = \pi$ is the LCM of both periods then the combined period of the given function is (π)

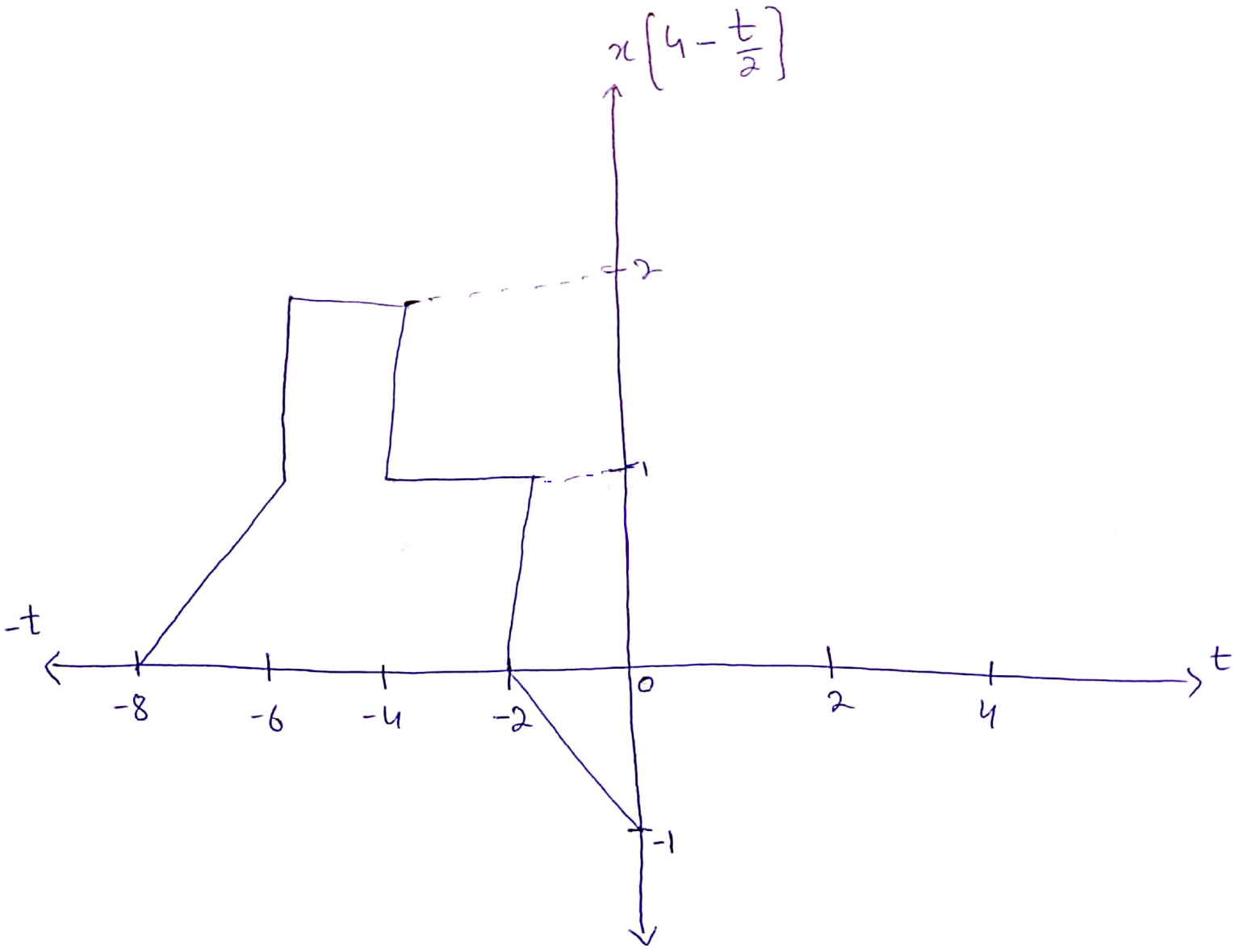
Q:-2

$x(4-\frac{t}{2})$

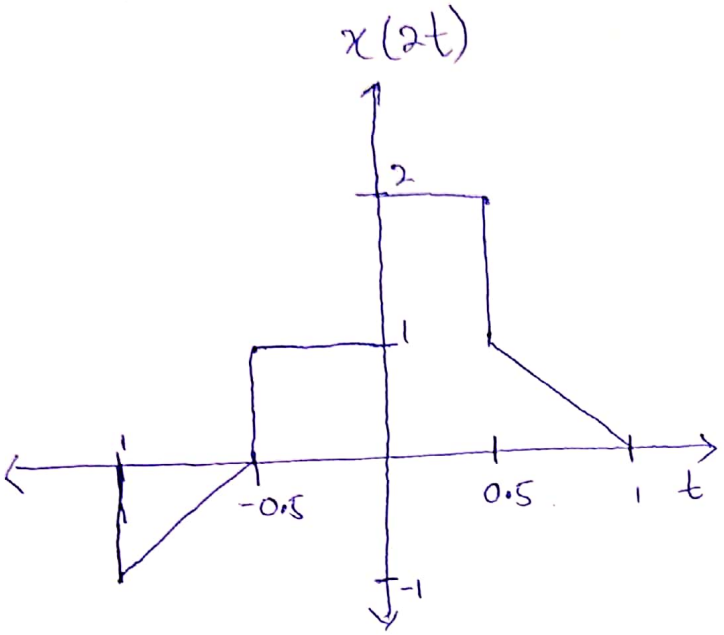


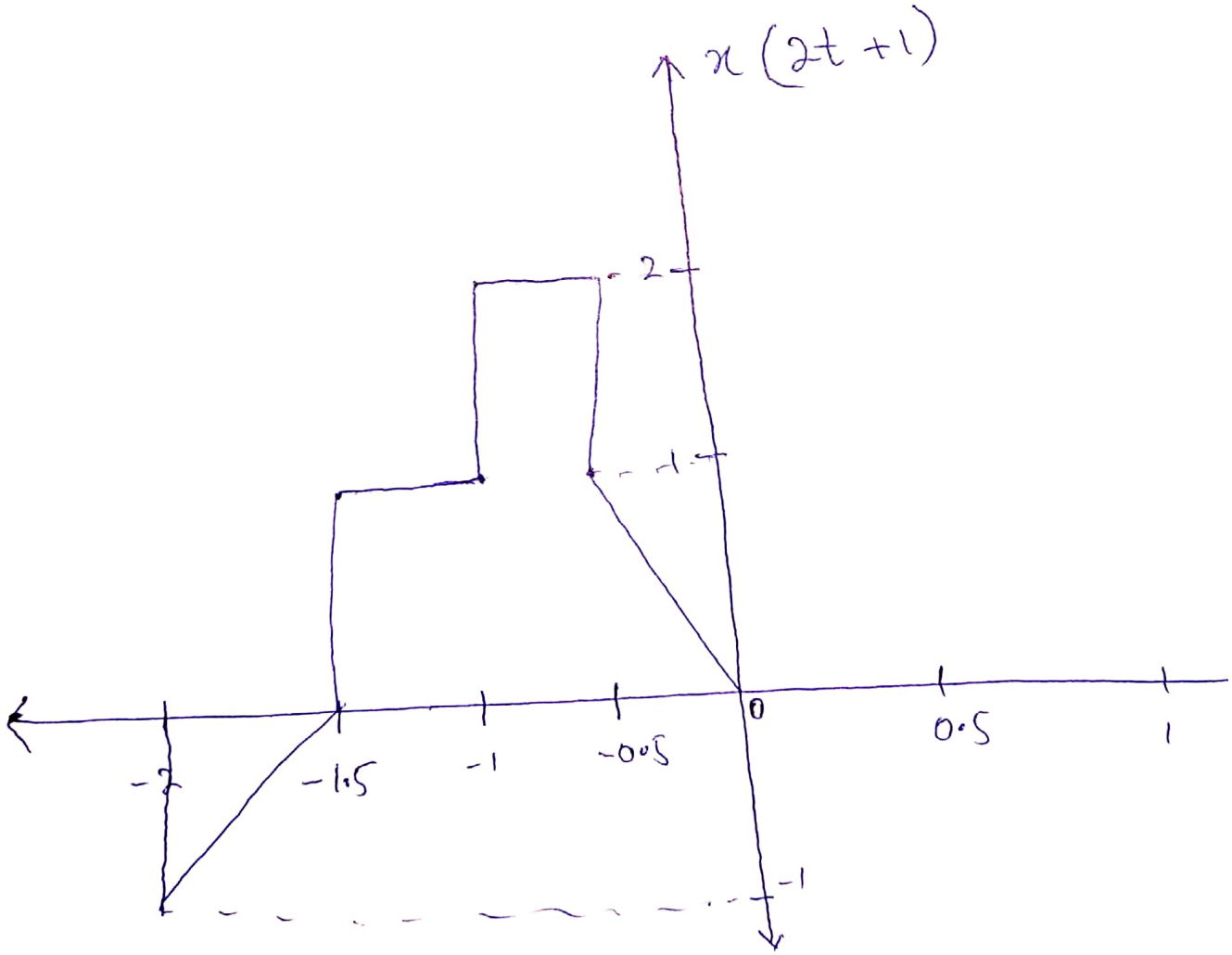



$x\left[-\frac{t}{2}\right]$
2
1
-1
-4
-2
0
2
4


$x\left[4-\frac{t}{2}\right]$
2
1
-1
-t
t
-8
-6
-4
-2
0
2
4

$x(2t+1)$





Q:- 3

$x(t)$, $y_1(t) = x(2t)$, $y_2(t) = x(t/2)$

① . It is true that if $x(t)$ is periodic, then $y_1(x)$ is period because $y_1(t)$ is nothing else but the frequency changed version of the function $x(t)$. here $y_1(t)$ has half the time period of $x(t)$ and double the frequency of $x(t)$-

② It is also true that if $y_1(t)$ is periodic then $x(t)$ is periodic while there is a difference between the frequency and time period of these two signals $x(t)$ and $y_1(t)$ - period of $y_1(t) = 2t$ means that the signal $x(t)$ will complete its duration in double the time of $y_1(t)$ -

③ The statement is still true, if $x(t)$ is periodic then $y_2(t)$ will also be period with the time period of double the period of $x(t)$) and half the frequency of $x(t)$ -

④ If $y_2(t)$ is periodic, then $x(t)$ will also be periodic while there with be a difference in time period and frequency of bothe signals -

$y_2(t)$ will be having double the time period and half the frequency as compared to the signal $x(t)$ -