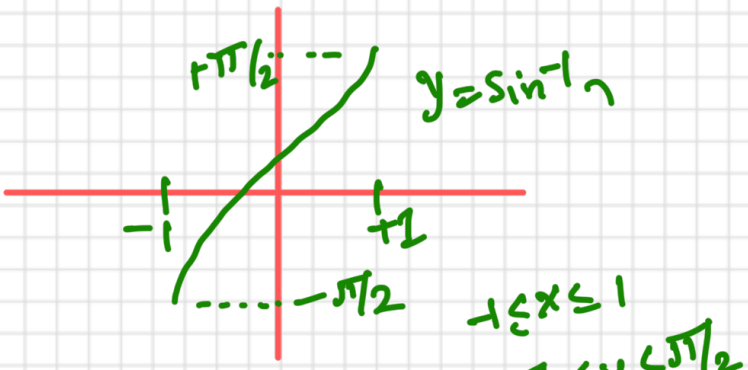
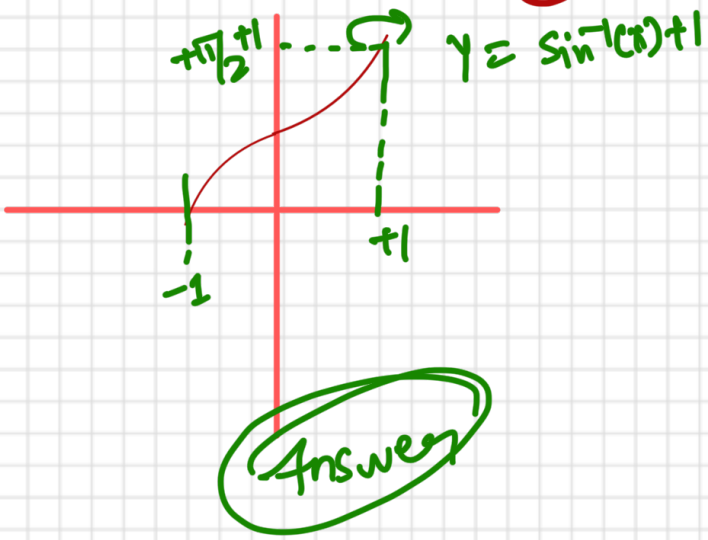
Classwork 04 CPE381 Fall 2024

① $y = \sin^{-1} x$ is given, plot $y = (\sin^{-1} x) + 1$ — 2 pts



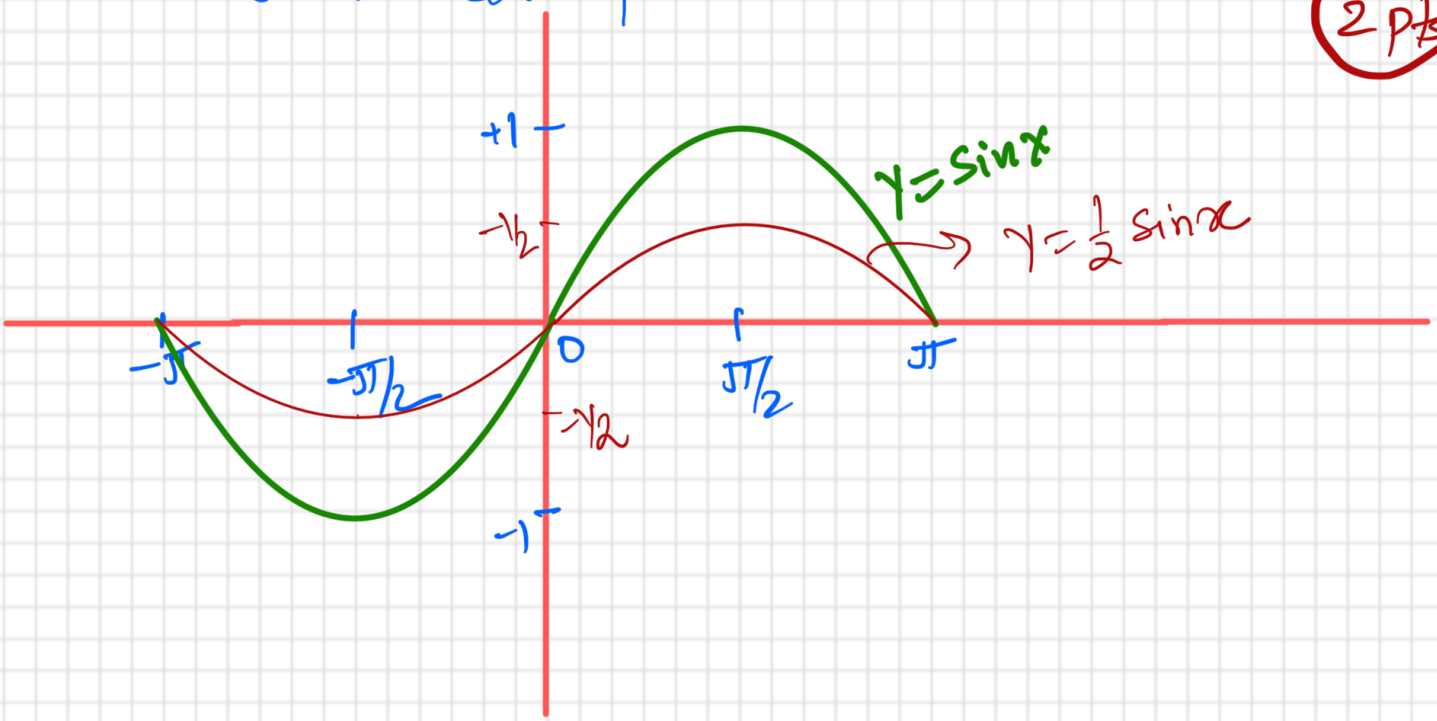
$-1 \le x \le 1$

$-\pi/2 \le y \le \pi/2$

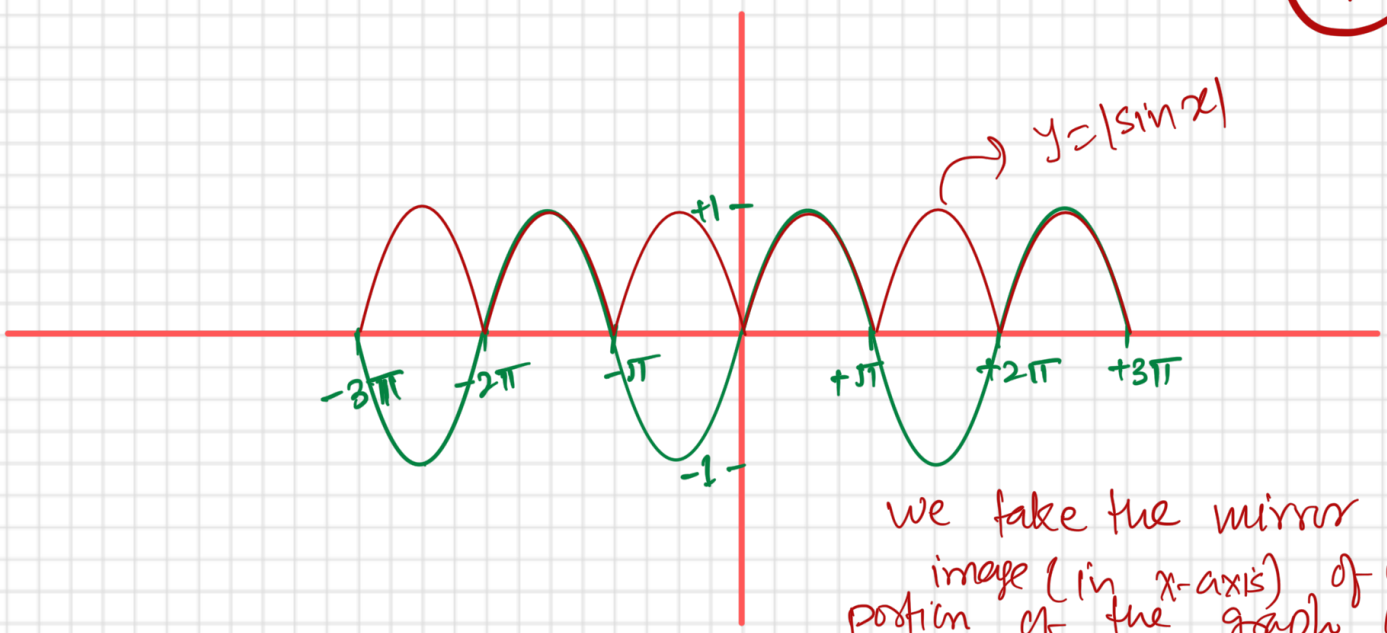


Answer

② Plot $y = \frac{1}{2}\sin x$, given the plot of $y = \sin x$, draw on the same plot. — 2 pts

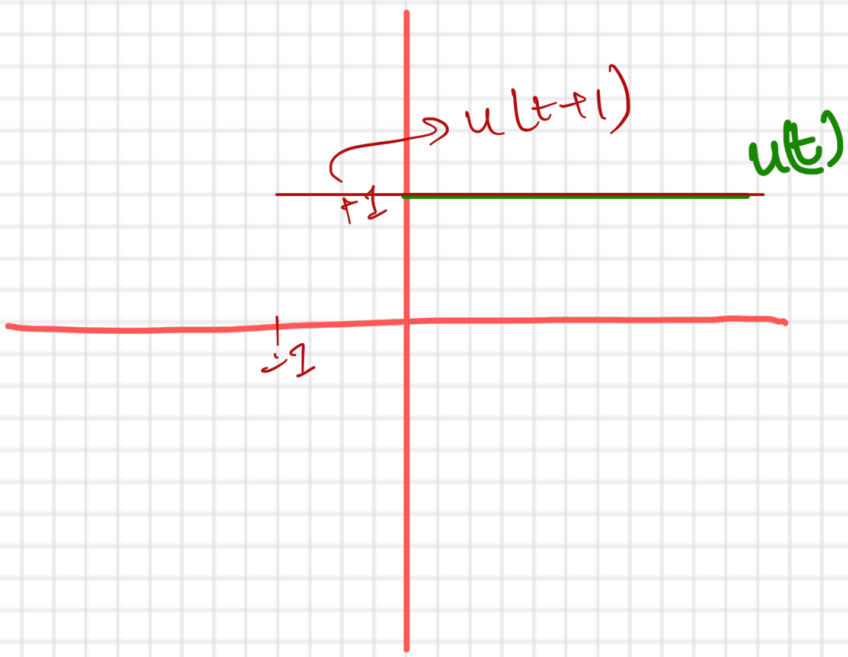


(3) Given $y = \sin x$, sketch $y = |\sin x|$ — 2pts

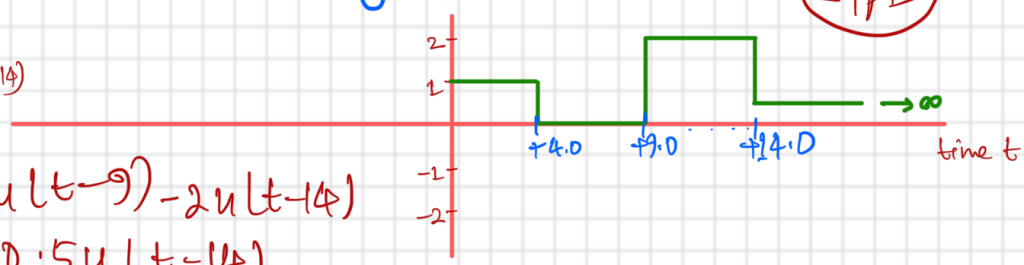


we take the mirror image (in x-axis) of the portion of the graph of sinx which lies below the x-axis.

(4) Assuming $u(t)$ is the unit-step function as discussed in the class, sketch $u(t+1)$ — 2pts



(5) Write down the equation governing the following signal shown in the graph below: — 4pts

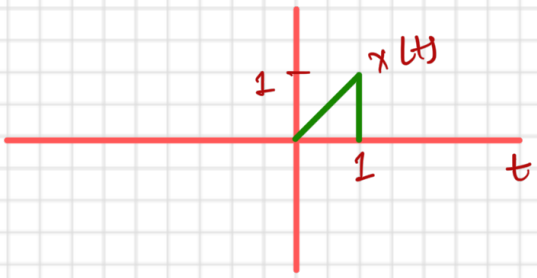


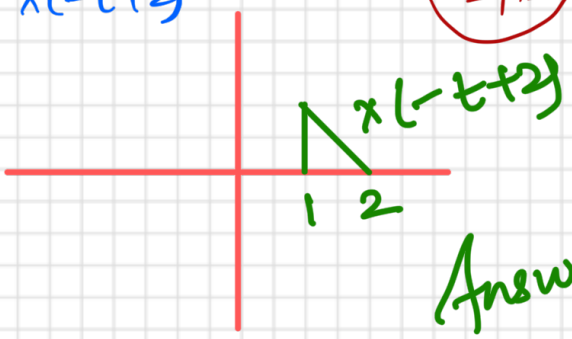
Answer: $u(t) - u(t-4) + 2(u(t-9) - u(t-14)) + 0.5\,u(t-14)$

$= u(t) - u(t-4) + 2u(t-9) - 2u(t-14) + 0.5u(t-14)$

$= u(t) - u(t-4) + 2u(t-9) - 1.5u(t-14)$

(6) Below is $x(t)$, sketch $x(-t+2)$ — 2pts





Answer=

(7) we have $x(t) = \cos(2\pi t) + \cos(4\pi t)$.

(a) what is the period T_0 of $\cos(2\pi t)$?

(b) what is the period T_1 of $\cos(4\pi t)$?

(c) what is the period T of $x(t)$?

3pts

Answer: (a) $T_0 = \frac{2\pi}{\omega_0} = \frac{2\pi}{2\pi} = 1$

(b) $T_1 = \frac{2\pi}{4\pi} = \frac{1}{2}$

(c) $\frac{T_0}{T_1} = \frac{1}{1/2} = 2. \Rightarrow T_0 = 2T_1$

Hence the overall fundamental period T of $x(t)$ is 1.

(8) Calculate the energy of the signal $z(t) = \begin{cases} 1, & 0 \le t \le 10 \\ 0, & \text{otherwise.} \end{cases}$

3pts

Answer: $E_z = \int_0^{10} z(t)dt = \int_0^{10} 1 \cdot dt = 10 - 0 = 10$