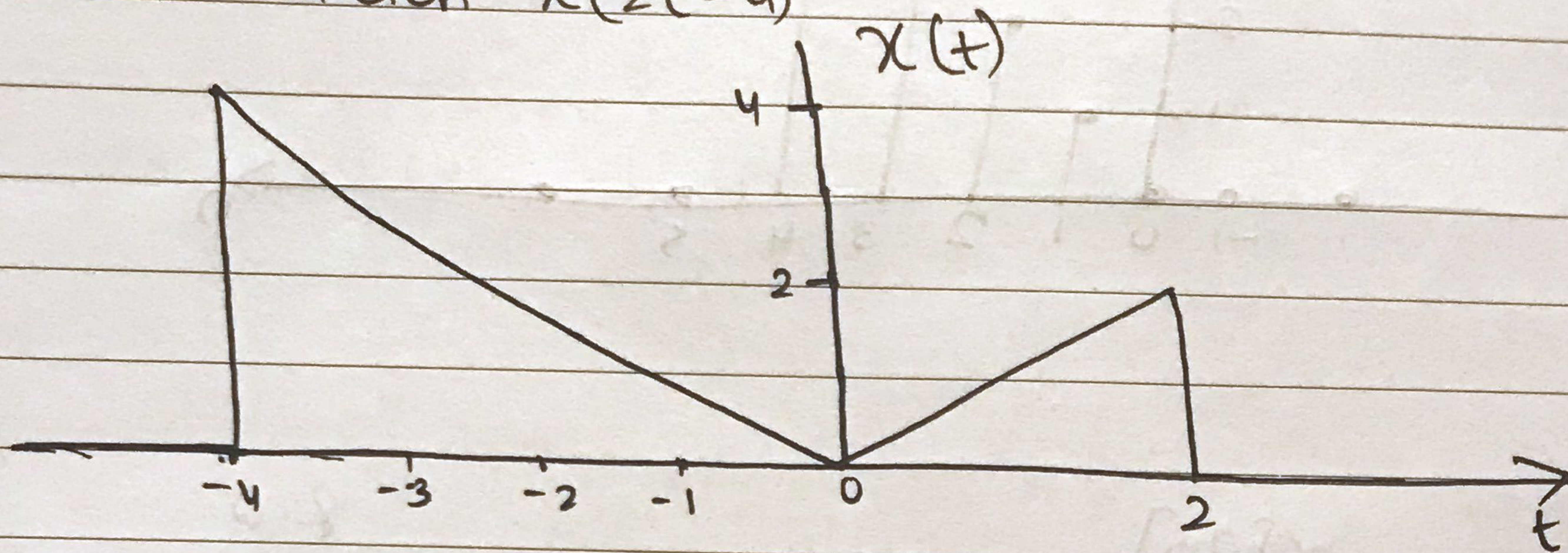


→ Quiz #1:-

→ SOLUTIONS

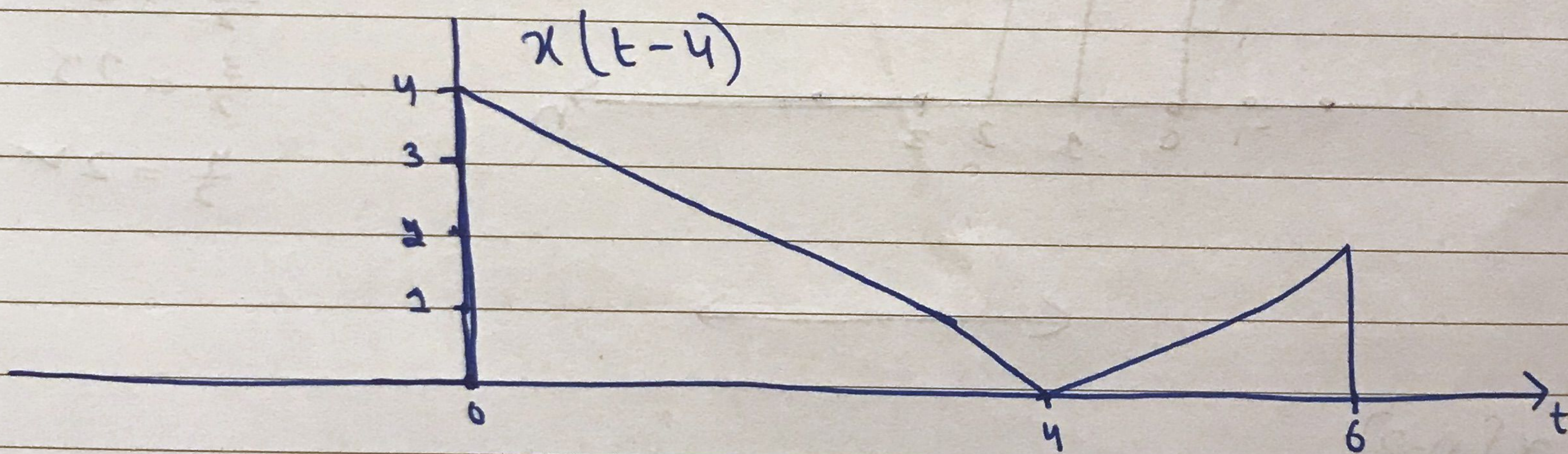
Q#1:-

Sketch $x(2t-4)$

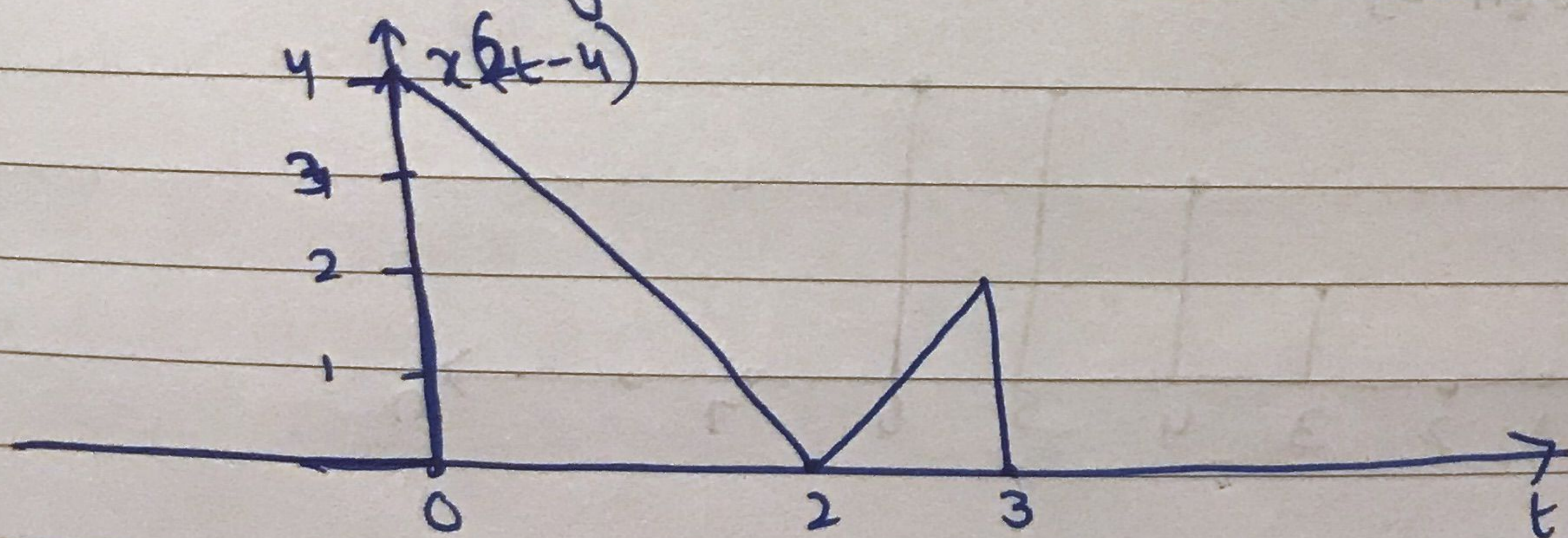


Sol:-

First shift $x(t)$ towards right (4 points to right)



Now scale by 2



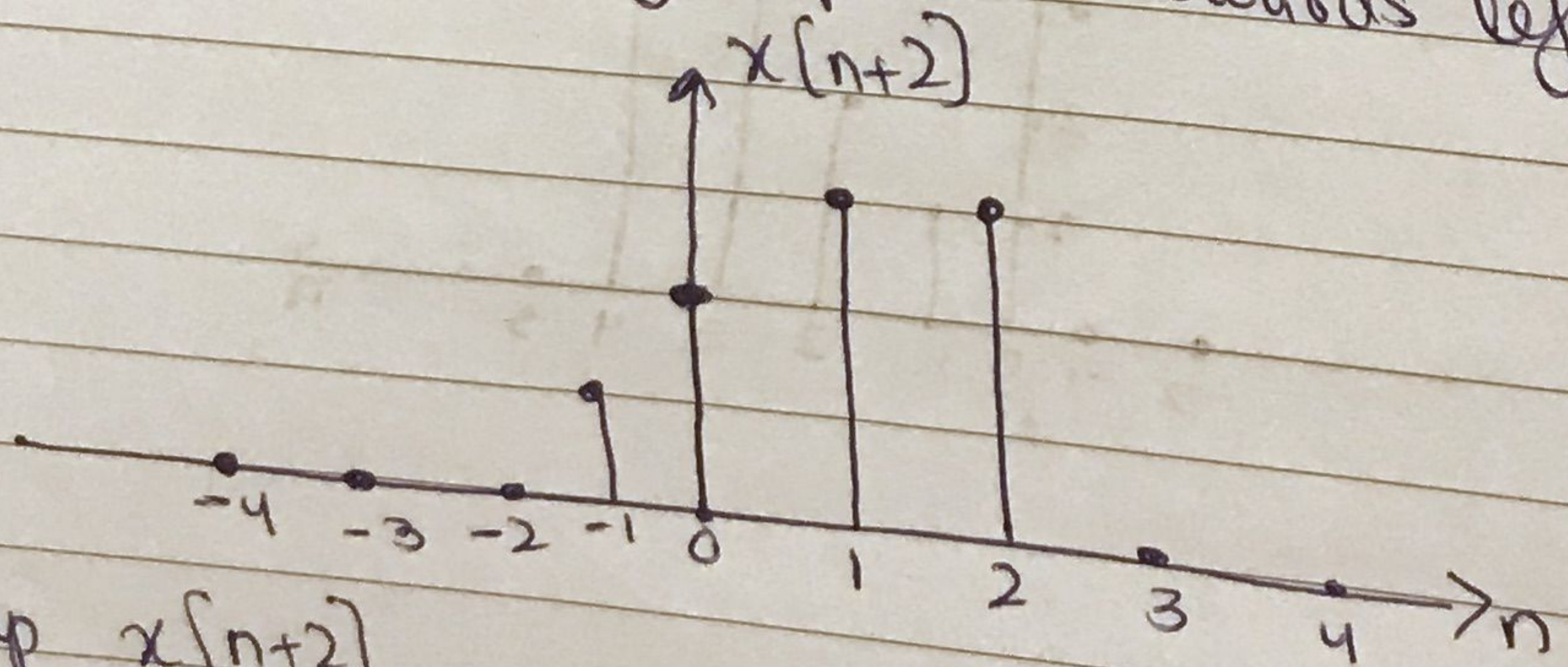
R.W

$$\frac{0}{2} = 0$$
$$\frac{4}{2} = 2$$
$$\frac{6}{2} = 3$$

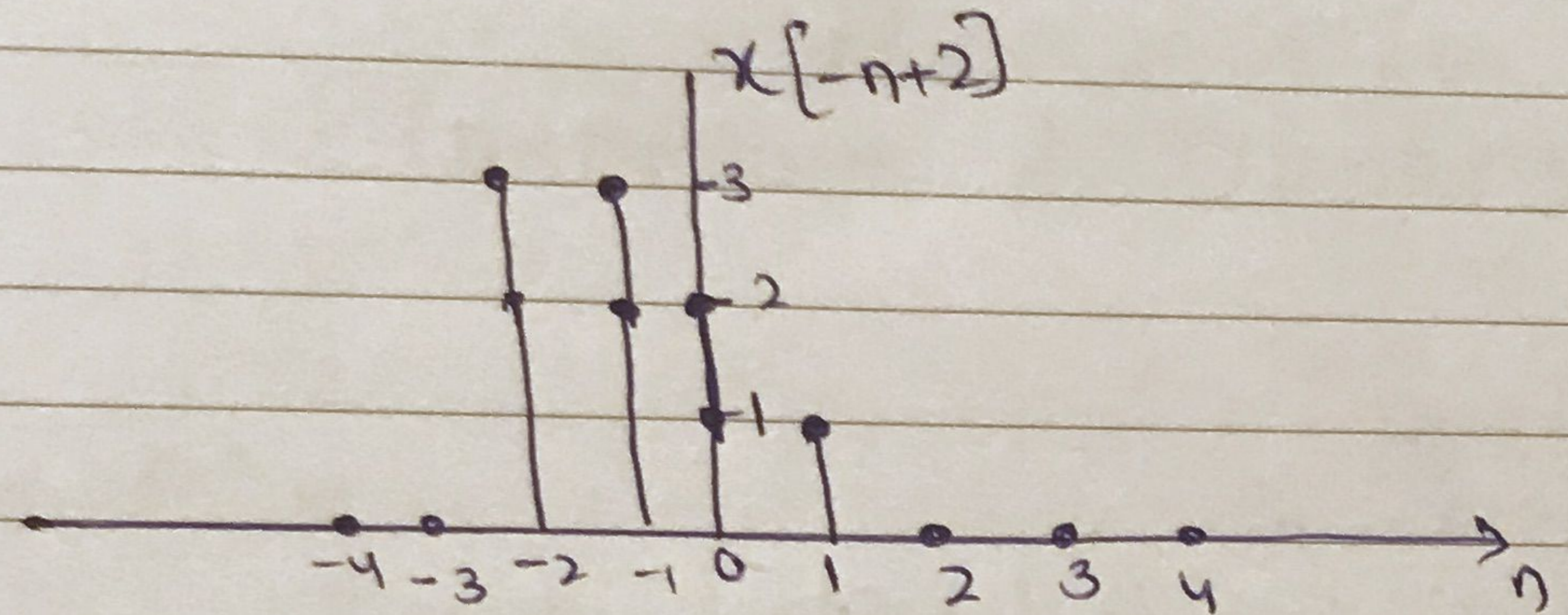
2) $x[-n+2]$

Sol

First shift $x[n]$ by 2 points towards left.



Now flip $x[n+2]$



Q # 2a

Periodic OR Aperiodic?

$$x(t) = \cos t + \sin \sqrt{2} t$$

Soln

Step #1

Find fundamental period of $x_1(t)$ and $x_2(t)$

$$x_1(t) = \cos t$$

$$, \quad x_2 = \sin \sqrt{2} t$$

$$T_1 = \frac{2\pi}{\omega_1} \quad \because \omega_1 = 1$$

$$, \quad T_2 = \frac{2\pi}{\omega_2} \quad \because \omega_2 = \sqrt{2}$$

$$T_1 = \frac{2\pi}{1} \Rightarrow 2\pi$$

$$, \quad T_2 \Rightarrow \frac{2\pi}{\sqrt{2}}$$

Step #2 Find rationality of $\frac{T_1}{T_2}$

$$\frac{T_1}{T_2} = \frac{2\pi}{2\pi/\sqrt{2}} = \frac{2\pi}{2\pi} \times \sqrt{2} \Rightarrow \sqrt{2} \text{ irrational.}$$

Hence, the ratio of $\frac{T_1}{T_2}$ is irrational, then the given

signal $x(t)$ is Aperiodic.

Q#3

$$x[n] = (-0.5)^n u[n]$$

Sol-

$$E = \sum_{n=-\infty}^{\infty} |x[n]|^2 = \sum_{n=0}^{\infty} |(0.5)^n|^2$$

$$E = \sum_{n=0}^{\infty} 0.25^n$$

Using geometric series formula: $\sum_{n=0}^{\infty} a^n = \frac{1}{1-a}$

$$E = \frac{1}{1-0.25} = \frac{4}{3} < \infty$$

Hence, $x[n]$ is an energy signal.
