

Paper 3C1
Answers for Examples Sheet 2: Signals and Systems

1. see Figure 1.

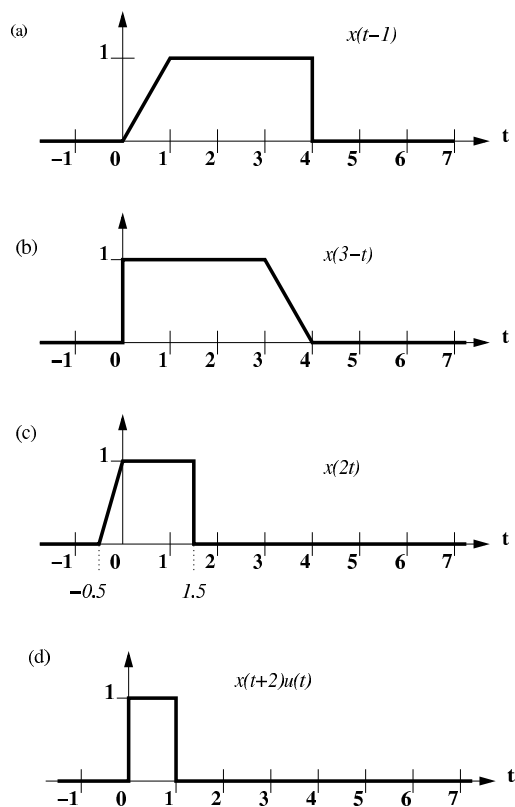


Figure 1: Answers for Question 1.

2. see Figure 2.

3. (a) u_{n-1}

(b) Remark: the ramp is defined such as $r_{-1} = 0$, $r_0 = 1$, $r_1 = 2$, etc. so one solution is:
 $x_n = r_{n+1} - r_{n-2} - r_{n-7} - r_{n-8} + 2 r_{n-9}$ (see fig. 3). Another one is: $x_n = r_{n+1} - r_{n-2} - r_{n-7} + r_{n-8} - 2 u_{n-8}$.

(c) $-\delta_{n+2}$

(d) $u(2-t)$

(e) $1.5 \delta(t+1) + 2 \delta(t-5)$

(f) $\frac{4}{5} r(t-1)$

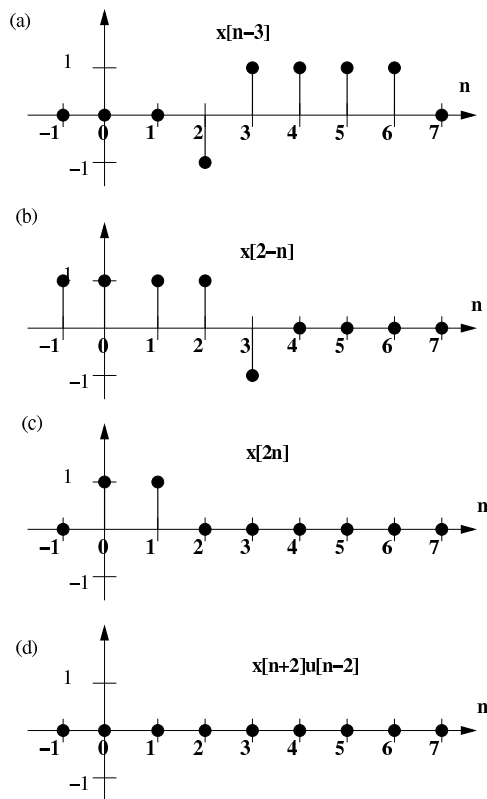


Figure 2: Answers for Question 2.

4. What is a Linear Time Invariant (LTI) system?

See course notes for answer.

See figure 4 for signal outputs.

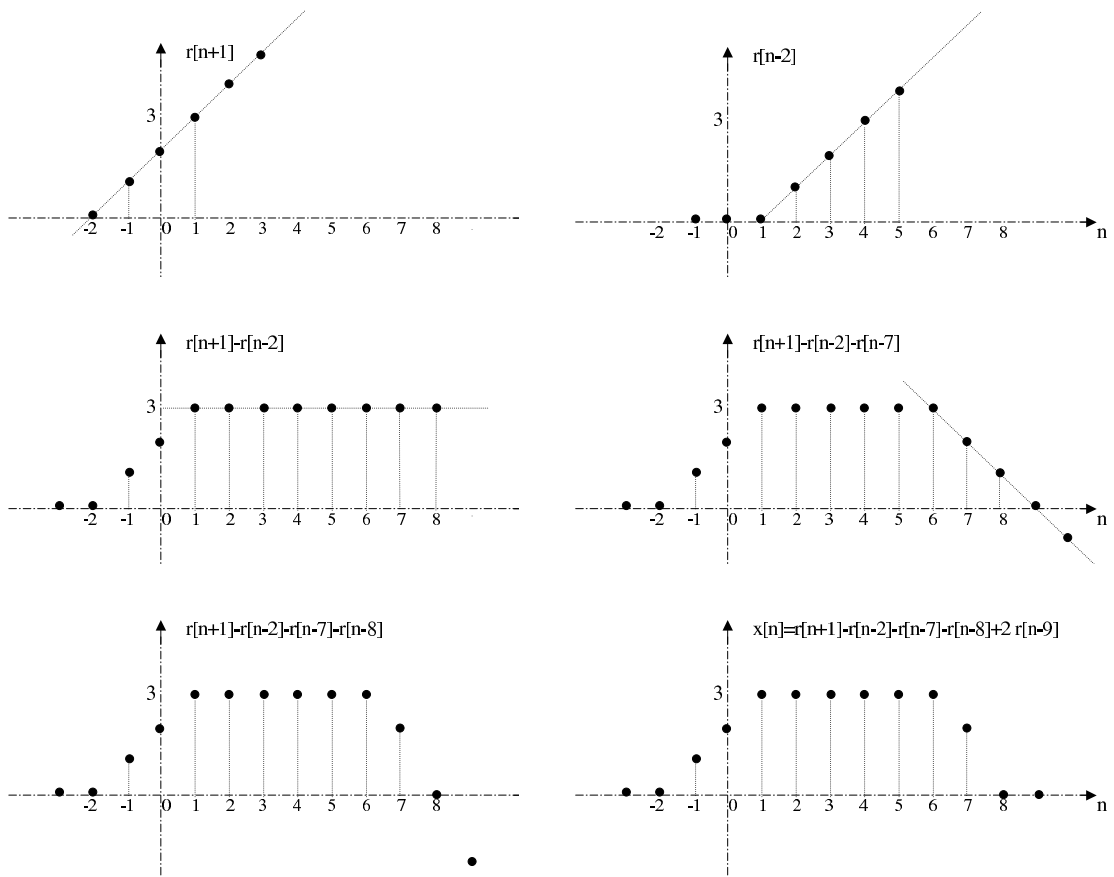


Figure 3: $x_n = r_{n+1} - r_{n-2} - r_{n-7} - r_{n-8} + 2r_{n-9}$.

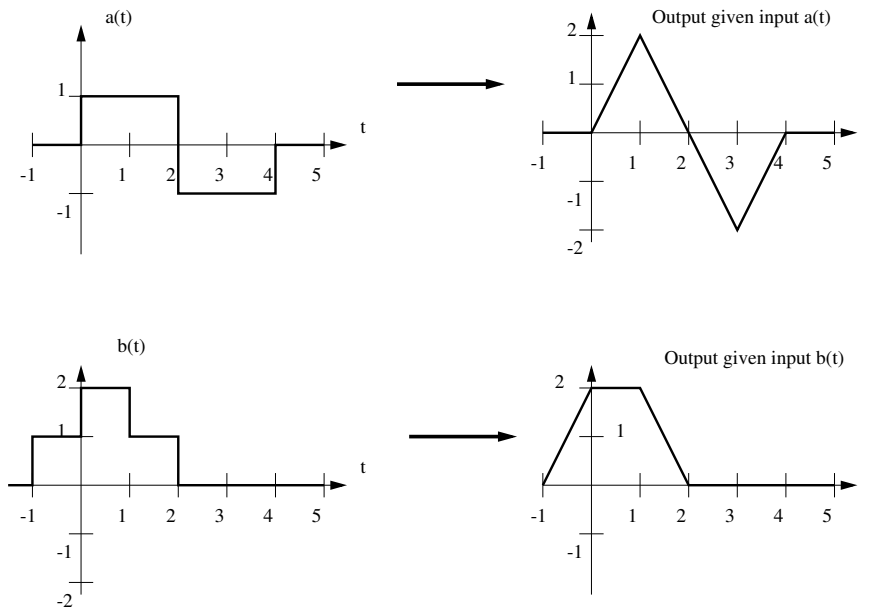


Figure 4: Answers for Question 4.