Scalar multiplication or Amplitude Scaling

1) $a = 3$

$x(n) = \{-2, -1, 0, \underset{\uparrow}{2}, 3, 4\}$

$y(n) = ax(n)$

$= \{3 \times x(-3), 3 \times x(-2), 3 \times x(-1),$

$3 \times x(0), 3 \times x(1), 3 \cdot x(2)\}$

$= \{3 \times -2, 3 \times -1, 3 \times 0, 3 \times 2, 3 \times 3,$

$3 \times 4\}$

$y(n) = \{-6, -3, 0, 6, 9, 12\}$

Signal Addition:

$$x_1(n) = \{ \underset{x_1(-2)}{2}, \underset{x_1(-1)}{-1}, \underset{x_1(0)}{1}, \underset{x_1(1)}{4}, \underset{x_1(2)}{3}, \underset{x_1(3)}{2} \}$$

$$x_2(n) = \{ \underset{x_2(-1)}{-1}, \underset{x_2(0)}{3}, \underset{x_2(1)}{0}, 2, \underset{x_2(3)}{-2} \}$$

$x_2(2)$

$$x_1(n) + x_2(n) = \{ x_1(-2) + x_2(-2),$$

$$x_1(-1) + x_2[-1), x_1(0) + x_2(0), x_1(1) +$$

$$x_2(1), \; x_1(2) + x_2(2), \; x_1(3) + x_2(3)]$$

$$x_1(n) + x_2(n) = \{ 2, -2, 4, 4, 5, 0 \}$$

Signal multiplier:

$$x_1(n) = \{ \underset{x_1(0)}{1}, \underset{x_1(1)}{2}, \underset{x_1(2)}{3}, \underset{x_1(3)}{4} \}$$

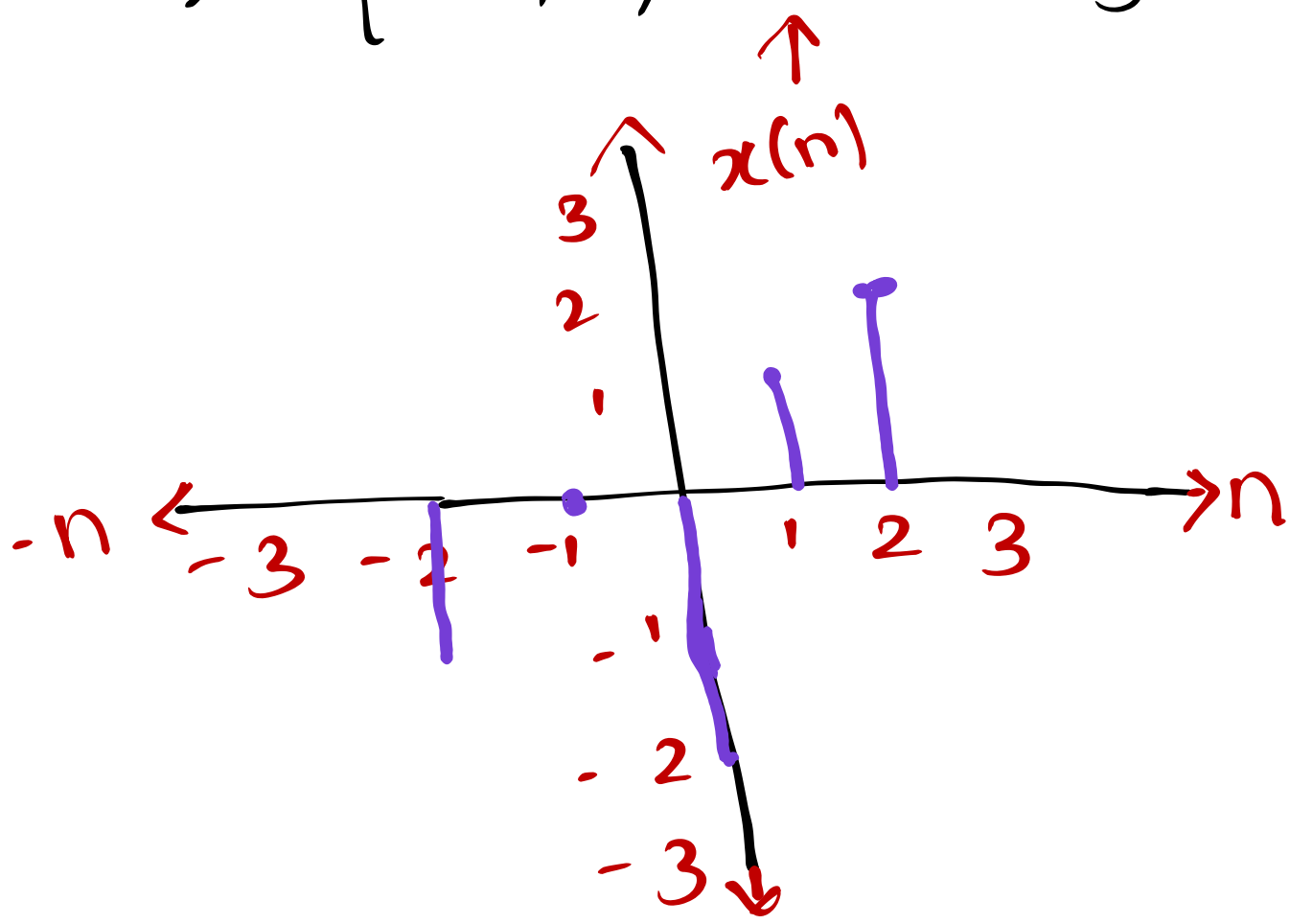
$$x_2(n) = \{ \underset{x_2(-2)}{2}, \underset{x_2(-1)}{3}, \underset{x_2(0)}{1}, \underset{x_2(1)}{2}, \underset{x_2(2)}{5}, \underset{x_2(3)}{4} \}$$

$$y(n) = x_1(n) \cdot x_2(n)$$

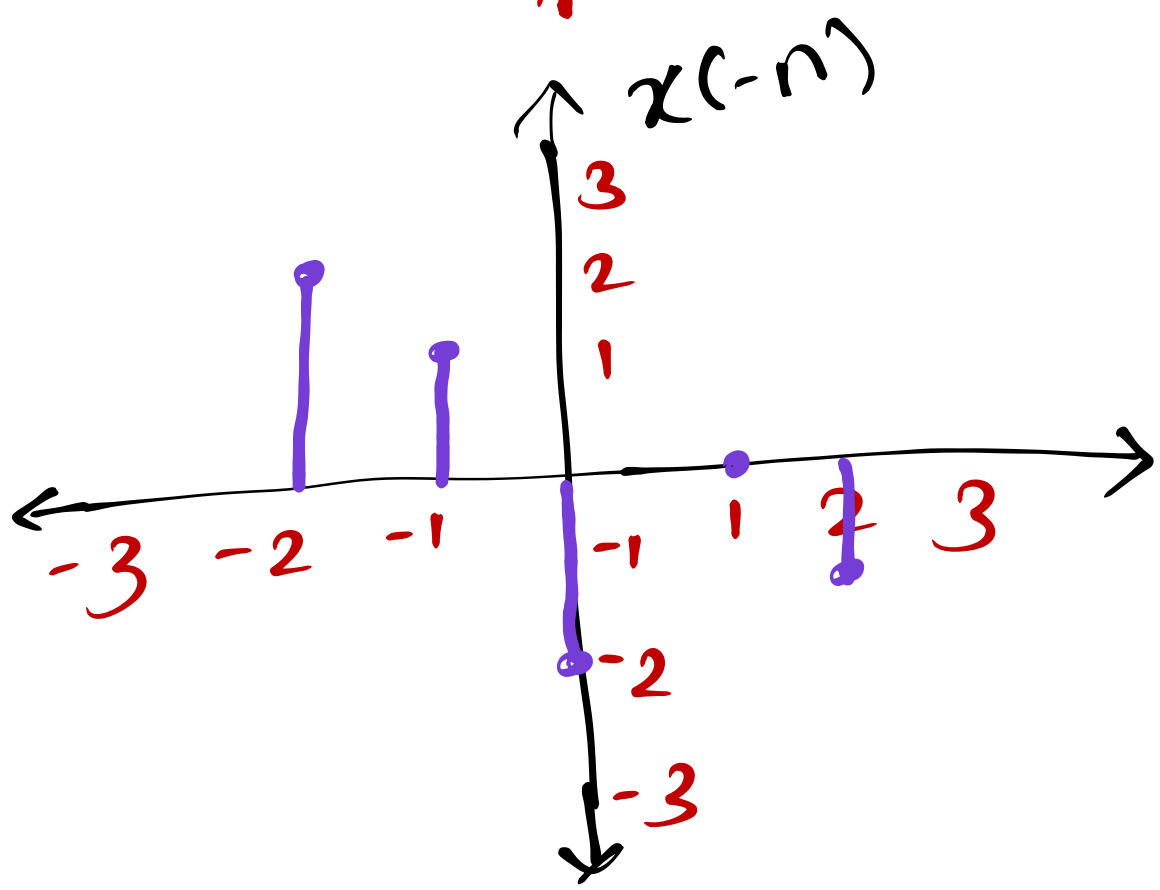
$$= \{0, 0, 1, 4, 15, 16\}$$

Time reversal:

$$x(n) = \{-1, 0, -2, 1, 2\}$$

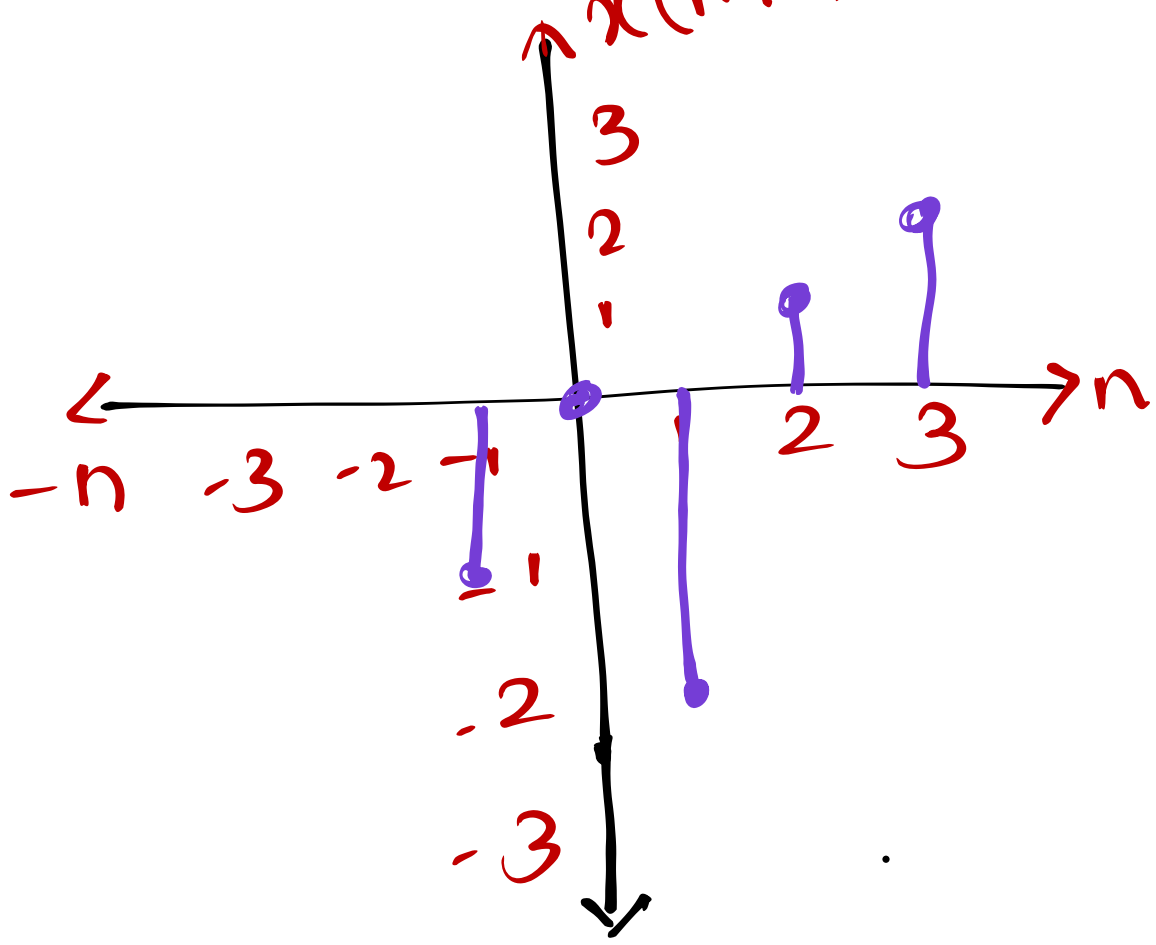


$$x(-n) = \{2, 1, -2, 0, -1\}$$



$x(n+1)$

$x(n+1) = \{-1, 0, -2, 1, 2\}$



$n = -2, -1, 0, 1, 2$

$x(-2+1) = x(-1)$

$x(-1+1) = x(0)$

$x(n-1) \Rightarrow x(-n+1), x(-n-1)$