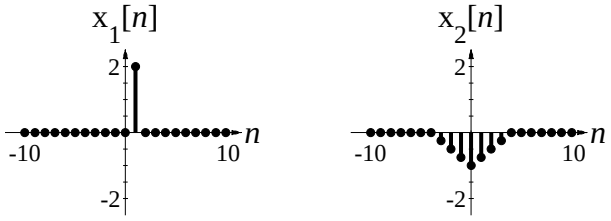
Solution of ECE 315 Test 5 F06

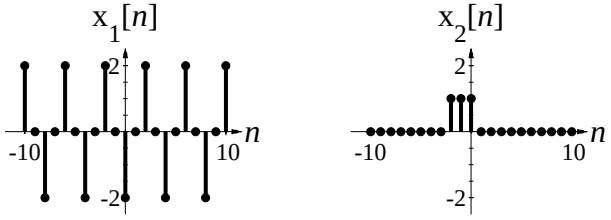
For each pair of signals $x_1[n]$ and $x_2[n]$, find the numerical value of $y[n] = x_1[n] * x_2[n]$ at the indicated value of *n*.

For each case $y[n] = x_1[n] * x_2[n] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[n-m]$.

1. 

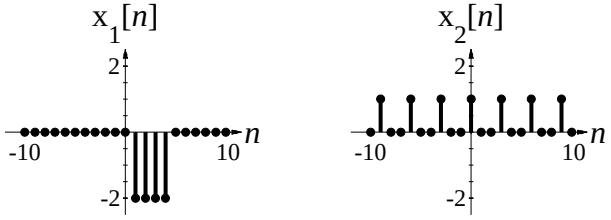
$y[-1] =$ <u>-1</u>

$$y[-1] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-1-m] = x_1[1]x_2[-2] = 2\times(-1/2) = -1$$

2. 

$y[3] =$ <u>-2</u>

$$y[3] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[3-m] = x_1[3]x_2[0] + x_1[4]x_2[-1] + x_1[5]x_2[-2]$$
$$= 0 + (-2) + 0 = -2$$

3. 

$y[-2] =$ <u>-4</u>

$$y[-2] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-2-m] = x_1[1]x_2[-3] + x_1[2]x_2[-4] + x_1[3]x_2[-5] + x_1[4]x_2[-6]$$
$$= -2 + 0 + 0 - 2 = -4$$

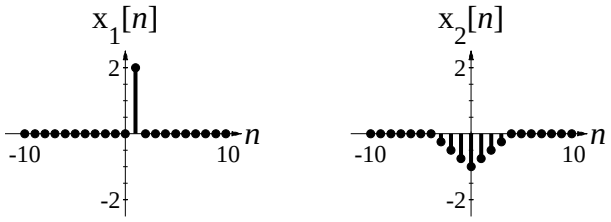
4. $x_1[n] = -3u[n]$ and $x_2[n] = \text{ramp}[n-1]$ $y[1] =$ <u>0</u>

$$y[n] = \sum_{m=-\infty}^{\infty} -3u[m]\,\mathrm{ramp}[n-m-1] \Rightarrow y[1] = -3\sum_{m=0}^{\infty} \mathrm{ramp}[-m] = 0$$

Solution of ECE 315 Test 5 F06

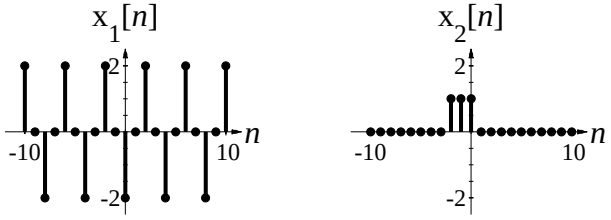
For each pair of signals $x_1[n]$ and $x_2[n]$, find the numerical value of $y[n] = x_1[n] * x_2[n]$ at the indicated value of *n*.

For each case $y[n] = x_1[n] * x_2[n] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[n-m]$.

1. 

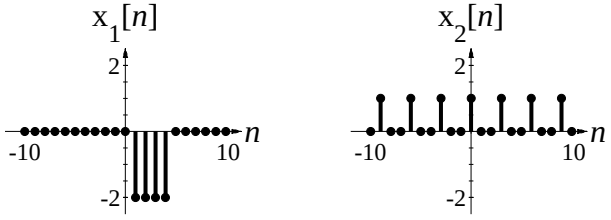
$y[1] =$ <u>-2</u>

$$y[1] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[1-m] = x_1[1]x_2[0] = 2\times(-1) = -2$$

2. 

$y[4] =$ <u>0</u>

$$y[4] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[4-m] = x_1[4]x_2[0] + x_1[5]x_2[-1] + x_1[6]x_2[-2]$$
$$= -2 + 0 + 2 = 0$$

3. 

$y[-1] =$ <u>-2</u>

$$y[-1] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-1-m] = x_1[1]x_2[-2] + x_1[2]x_2[-3] + x_1[3]x_2[-4] + x_1[4]x_2[-5]$$
$$= 0 - 2 + 0 + 0 = -2$$

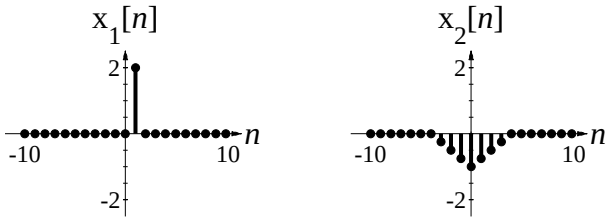
4. $x_1[n] = -3u[n]$ and $x_2[n] = \text{ramp}[n-1]$ $y[2] =$ -3

$$\mathrm{y}[n]=\sum_{m=-\infty}^{\infty}-3\mathrm{u}[m]\mathrm{ramp}[n-m-1]\Rightarrow \mathrm{y}[2]=-3\sum_{m=0}^{\infty}\mathrm{ramp}[1-m]=-3$$

Solution of ECE 315 Test 5 F06

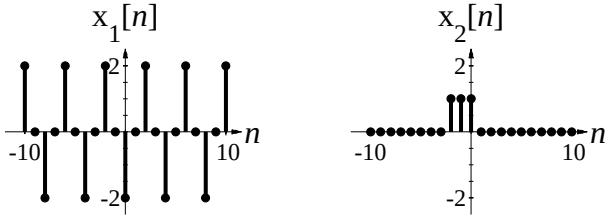
For each pair of signals $x_1[n]$ and $x_2[n]$, find the numerical value of $y[n] = x_1[n] * x_2[n]$ at the indicated value of *n*.

For each case $y[n] = x_1[n] * x_2[n] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[n-m]$.

1. 

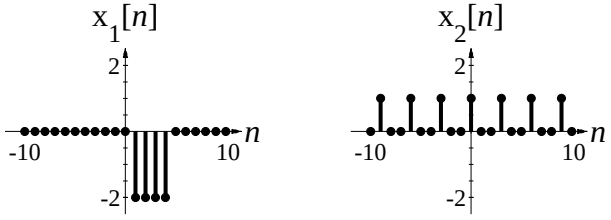
$y[0] =$ <u>-3/2</u>

$$y[0] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-m] = x_1[1]x_2[-1] = 2 \times (-3/4) = -3/2$$

2. 

$y[-3] =$ <u>2</u>

$$y[-3] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-3-m] = x_1[-3]x_2[0] + x_1[-2]x_2[-1] + x_1[-1]x_2[-2]$$
$$= 0 + 2 = 0 = 2$$

3. 

$y[0] =$ <u>-2</u>

$$y[0] = \sum_{m=-\infty}^{\infty} x_1[m]x_2[-m] = x_1[1]x_2[-1] + x_1[2]x_2[-2] + x_1[3]x_2[-3] + x_1[4]x_2[-4]$$
$$= 0 + 0 - 2 + 0 = -2$$

4. $x_1[n] = -3u[n]$ and $x_2[n] = \text{ramp}[n-1]$ $y[3] =$ <u>-9</u>

$$y[n] = \sum_{m=-\infty}^{\infty} -3u[m]\,\mathrm{ramp}[n-m-1] \Rightarrow y[3] = -3\sum_{m=0}^{\infty} \mathrm{ramp}[2-m] = -9$$