1. let $x[n] \leftrightarrow X(e^{j\theta})$ and $y[n] \leftrightarrow Y(e^{j\theta})$

$Y(e^{j(\omega-\theta)}) = e^{j\omega n} \cdot Y(e^{j\theta})$

so $\frac{1}{2\pi} \cdot \frac{1}{2\pi} \int_{2\pi} X(e^{j\theta}) \cdot Y(e^{j\theta}) \cdot e^{j\omega n} \, d\theta$

does $x[n]\,y[n] \leftrightarrow = \frac{1}{2\pi}[X(\Omega) \times Y(\Omega)]$

$x(n) = \frac{1}{2\pi} \int_{2\pi} X(\Omega) e^{j\Omega n} \, d\Omega$

$\frac{1}{2\pi} \iint_{2\pi} X(e^{j\theta}) Y(e^{j\theta}) e^{j\omega n} \, d\theta$

$= \frac{1}{2\pi} e^{j\omega n} X(e^{j\theta}) \cdot \frac{1}{2\pi} e^{j\omega n} Y(e^{j\theta})$

$= x(n) \cdot y(n)$

2. $(f(n))^2 = v(n) \quad s(n-n_0) \cdot s(n-n_0) = v(n-n_0)$

so $x[n] \cdot h[n] = v(n) + 2v(n-1) - v(n-2) + v(n-3)$
$+ v(n-1) + 2v(n-2) - v(n-3) - v(n-4)$

$= v(n) + 3v(n-1) + v(n-2) + v(n-4)$