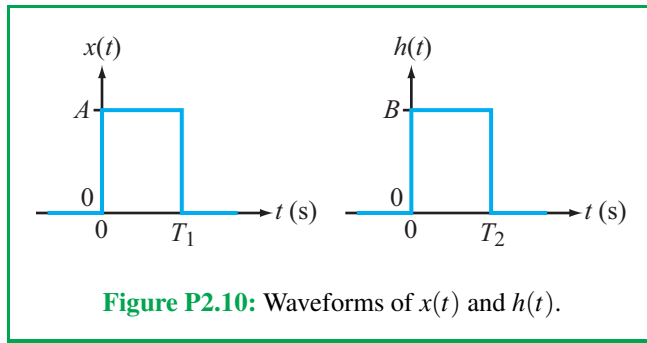**Problem 2.10** Functions $x(t)$ and $h(t)$ are both rectangular pulses, as shown in Fig. P2.10. Apply graphical convolution to determine $y(t) = x(t) * h(t)$ for:

(a) $A = 1$, $B = 1$, $T_1 = 2$ s, $T_2 = 4$ s

(b) $A = 2$, $B = 1$, $T_1 = 4$ s, $T_2 = 2$ s

(c) $A = 1$, $B = 2$, $T_1 = 4$ s, $T_2 = 2$ s.

Figure P2.10: Waveforms of $x(t)$ and $h(t)$.

Solution:

(c)

$h(-\lambda)$ 2

$x(\lambda)$

1
0

−2 −1   0   1   2   3   4 λ

$t = 0$

2

$x(\lambda)$

$h(1 - \lambda)$ 1
0

−1   0   1   2   3   4 λ

At $t = 1$ s, overlap = 2 units

Progressive sliding
of $h(-\lambda)$ to the right
leads to:

$y(t)$

4

2

0

0   1   2   3   4   5   6 t (s)

$y(t)$