1. Match the equations

\[ y_1(t) = u_1(t) - u_2(t), \quad y_2(t) = (2 - t)(u_1(t) - u_2(t)), \quad y_3(t) = (t - 1)u_1(t) - (t - 2)u_2(t), \]
\[ y_4(t) = (1 - |t|)(u_1(t) - u_3(t)), \quad y_5(t) = (t - 1)(u_1(t) - u_2(t)), \quad y_6(t) = (2 - t)u_1(t) + (t - 3)u_2(t), \]
\[ y_7(t) = (t - 2)u_1 - (t - 2)u_2(t) \]

... to the graphs A – F below and draw the missing graph.

2. True or False and a brief reason why or why not.

(a) If \( c = \max\{a, b\} \), then \( u_a(t)u_b(t) = u_c(t) \)
(b) If \( c = \max\{a, b\} \), then \( \delta(t - a)\delta(t - b) = \delta(t - c) \)
(c) For constants \( a \) and \( b \) and for \( t \geq 0 \) the solutions to the IVP \( y' + ay = 0, y(0) = b \) and the IVP \( y' + ay = b\delta(t), y(0) = 0 \) have the same solution.
(d) For constants \( a, b \) and \( c \), and for \( t \geq 0 \) the solutions to the IVP \( y'' + ay' + by = 0, y(0) = c, y'(0) = 1 \) and the IVP \( y'' + ay' + by = \delta(t), y(0) = c, y'(0) = 0 \) have the same solution.
(e) When \( 0 < a < b \), and \( \mathcal{L}[h(t)] = H(s) \) then the inverse Laplace transform of \( (\exp(-as) - \exp(-bs))H(s) \) is \( (u_a(t) - u_b(t))h(t - a) \).
(f) \( \mathcal{L}^{-1}[(s + 2)/(s + 1)^2 + 4)] = e^{-t}\cos 2t \)
(g) \( \int_{-\infty}^{\infty} \delta(t)\sin(2t)/t\,dt = 2 \)
(h) \( \int_{-\infty}^{\infty} u_a(t) - u_b(t)\,dt = b - a \)
(i) \( \lim_{t \to -a^-} u_c(t) = 1 \)
(j) \( |t| = tu_0(t) - t \)