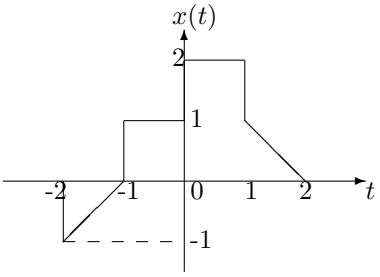
ELEC 255 tutorial. Practice 1.
Continuous-Time Signals and Systems

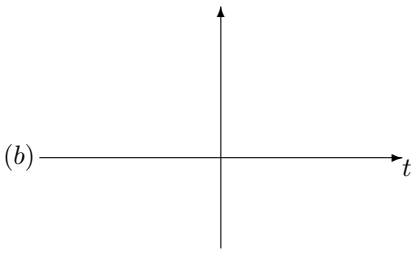
STUDENT #: _____ MARKS:_____/50

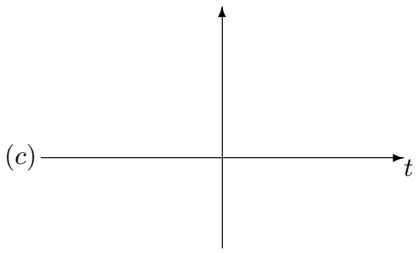
Problem 1: [5 marks/part]

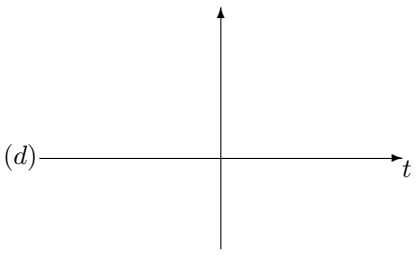
A signal $x(t)$ is shown in the figure below. (a)Use unit-step functions to find a single expression for $x(t)$ that is valid for all t. Note that when stating your final answer, group together terms having the same unit-step function factor.

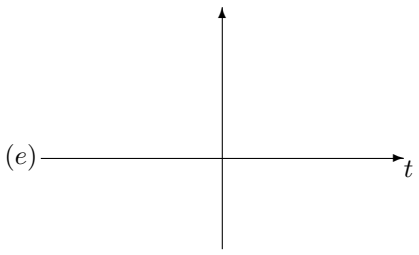


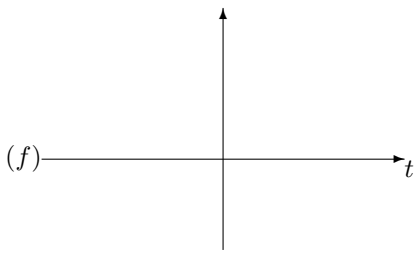
Sketch and label carefully each of the following signals:
(b) $x(t-1)+1$, (c) $3x(2-t)$, (d) $x(2t+1)$, (e) $[x(t)+x(-t)]u(t)$, (f)$x(t)[\delta(t+\frac{3}{2})-\delta(t-\frac{3}{2})]$.



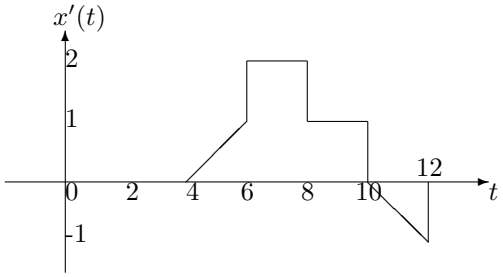








(g) Given the signal $x(t)$ in part (a) and $x'(t)$ shown in the figure below, express $x'(t)$ in terms of $x(t)$.



Problem 2: [5 marks/part]

Suppose that we have the system with input $x(t)$ and output $y(t)$ given by $y(t) = x(t-2) + x(2-t)$. Determine whether the system has linear property.

Problem 3: [5 marks/part]

Check the stability of two systems, and clearly state your reason.
(a)$y(t) = e^{x(t)}$, (b) $y(t) = tx(t)$.