

# MAE 143 A: Signals and Systems.

## Homework #1.

Assigned Mar 31. Due Apr 7

1. Sketch the following continuous-time signals. You should draw by hand (do not use MATLAB or a calculator) after reasoning how the signals look like.
  - (a)  $g(t) = u(t + 1) - 2u(t - 1) + u(t - 3)$
  - (b)  $g(t) = (t + 1)u(t - 1) - tu(t) - u(t - 2)$
  - (c)  $g(t) = 3\delta(3t) + 6\delta(4(t - 2))$
  - (d)  $g(t) = 2(t - 1)u(t - 1) - 2(t - 2)u(t - 2) + 2(t - 3)u(t - 3)$
2. Given the graphical definition of a function in figure E.45 (a) (see the book, Chapter 2), graph the transformations:
  - (a)  $g(2t + 1)$
  - (b)  $-3g(-t)$
3. Describe the following signals in the Book, Chapter 2 (section on exercises):
  - (a) the signal in Figure E42 as a ramp function minus a summation of step functions
  - (b) the signal in Figure E43 as a sum of shifted semicircles.
4. (Book, Chp 2, Exercise 59, parts (b) and (e)) For each of the following functions, decide whether it is periodic and, if it is, find the fundamental period.
  - (a)  $g(t) = 14 + 40 \cos(60\pi t)$
  - (b)  $g(t) = 10 \sin(5t) - 4 \cos(7t)$