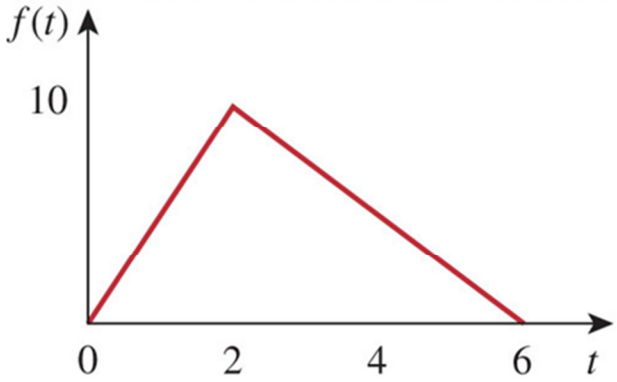
IUPUI ECE 202 Spring 2015:

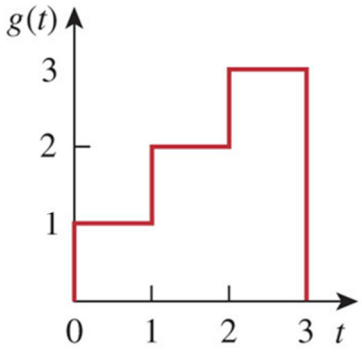
Homework #7 (Due in class: March 23, 2015) Name:

1. (Prob. 15.8 in text) Find the Laplace transform, F(s), given that f(t) is:
   a. $2t \cdot u(t-4)$ (u is the unit step function)
   b. $4\cos(t)\delta(t-2)$ (δ is the Dirac delta function)
   c. $e^{-t} \cdot u(t-\tau)$
   d. $\sin(2t) \cdot u(t-\tau)$

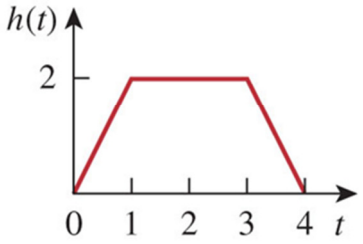
2. (Prob. 15.14 from Text) Find the Laplace transform of the signal in the figure below:



3. (Prob. 15.18 from Text) Find the Laplace transform of the signals in the figures a) and b) below:



(a)



(b)

4. (Prob. 15.25 from Text) For the given transfer function F(s):

$$F(s) = \frac{5(s+1)}{(s+2)(s+3)}$$

a. Use the initial and final value theorems to find $f(0)$ and $f(\infty)$
b. Verify your answer in part (a) by finding $f(t)$, using partial fractions

5. (Prob. 15.27 from Text) Determine the inverse Laplace transform of the following functions:

(a) $F(s) = \frac{1}{s} + \frac{2}{s+1}$

(b) $G(s) = \frac{3s+1}{s+4}$

(c) $H(s) = \frac{4}{(s+1)(s+3)}$

(d) $J(s) = \frac{12}{(s+2)^2(s+4)}$

6. (Prob. 15.37 from Text) Determine the inverse Laplace transform of the following functions:

(a) $$H(s)=\frac{s+4}{s(s+2)}$$

(b) $$G(s)=\frac{s^2+4s+5}{(s+3)(s^2+2s+2)}$$

(c) $$F(s)=\frac{e^{-4s}}{s+2}$$

(d) $$D(s)=\frac{10s}{(s^2+1)(s^2+4)}$$