Math 260 **Inverse Laplace transforms** **Due: March 20, 2020**

Video 1. Start with the video introducing Laplace transforms.

$f(t)$	1	t^n	e^{at}	$t^n e^{at}$	$\sin \omega t$	$\cos \omega t$	$\sinh bt$	$\cosh bt$	$\delta(t - t_0)$
$F(s)$	$\frac{1}{s}$	$\frac{n!}{s^{n+1}}$	$\frac{1}{s-a}$	$\frac{n!}{(s-a)^{n+1}}$	$\frac{\omega}{s^2+\omega^2}$	$\frac{s}{s^2+\omega^2}$	$\frac{b}{s^2-b^2}$	$\frac{s}{s^2-b^2}$	$e^{-t_0 s}$

Theorem (Linearity Property)**.** Let $c_1, c_2, \ldots, c_n$ be constants and let $F_1, F_2, \ldots, F_n$ be functions. Then

$$L^{-1}(c_1F_1 + c_2F_2 + \cdots + c_nF_n) = c_1L^{-1}(F_1) + c_2L^{-1}(F_2) + \cdots + c_nL^{-1}(F_n)$$

1. Use the table of Laplace transforms to find the inverse Laplace transforms of:

a) $F(s) = \dfrac{8}{s-2}$

b) $F(s) = \dfrac{s}{s^2+4}$

c) $F(s) = \dfrac{8}{s^2+4}$

d) $F(s) = \dfrac{8}{s-2} - \dfrac{s}{s^2+4} + \dfrac{3}{s^4}$

Video 2. Watch the video on using Heaviside's method (for partial fraction decompositions).

2. Use Heaviside's method to find the inverse Laplace transforms of:

a) $\dfrac{3-(s+1)(s-2)}{(s+1)(s+2)(s-2)}$

b) $\dfrac{2+(s-2)(3-2s)}{(s-2)(s+2)(s-3)}$