

## MATH 275 – Laplace Transform & u-notation practice

General rule:  $L\{u_c(t)f(t - c)\} = e^{-st}L\{f(t)\}$

Rules: if you have questions, post them to Piazza.

Easy:

1.  $L\{u_9(t)\}$
2.  $L\{u_3(t)4\}$
3.  $L\{u_4(t)(t - 4)\}$
4.  $L\{u_2(t)(t - 2)^2\}$
5.  $L\{u_1(t)(t - 1)^3\}$
6.  $L\left\{u_{\pi/3}(t) \cos\left(t - \frac{\pi}{3}\right)\right\}$
7.  $L\{u_1(t) \sin(t - 1)\}$

Build in the shift first:

8.  $L\{u_3(t)t\}$
9.  $L\{u_7(t)t^2\}$
10.  $L\{u_4(t)t^3\}$
11.  $L\{u_{\pi/6}(t) \sin t\}$
12.  $L\{u_\pi(t) \cos(2t)\}$

Invert:

13.  $L^{-1}\left\{\frac{e^{-2s}}{s}\right\}$
14.  $L^{-1}\left\{\frac{e^{-5s}}{s^2}\right\}$
15.  $L^{-1}\left\{\frac{e^{-7s}}{s^4}\right\}$
16.  $L^{-1}\left\{\frac{4e^{-5s}}{s^8}\right\}$
17.  $L^{-1}\left\{e^{-s}\left(\frac{1}{s^2+16}\right)\right\}$
18.  $L^{-1}\left\{e^{-10s}\left(\frac{s}{s^2+12}\right)\right\}$
19.  $L^{-1}\left\{\frac{e^{-2s}}{s(s-1)(s+3)^2}\right\}$

Challenging:

20.  $L\{u_2(t) + u_5(t)t^2\}$
21.  $L\{u_3(t)t - u_5(t)t^3\}$
22.  $L^{-1}\left\{\frac{e^{-s}+e^{-4s}}{s^2-9}\right\}$