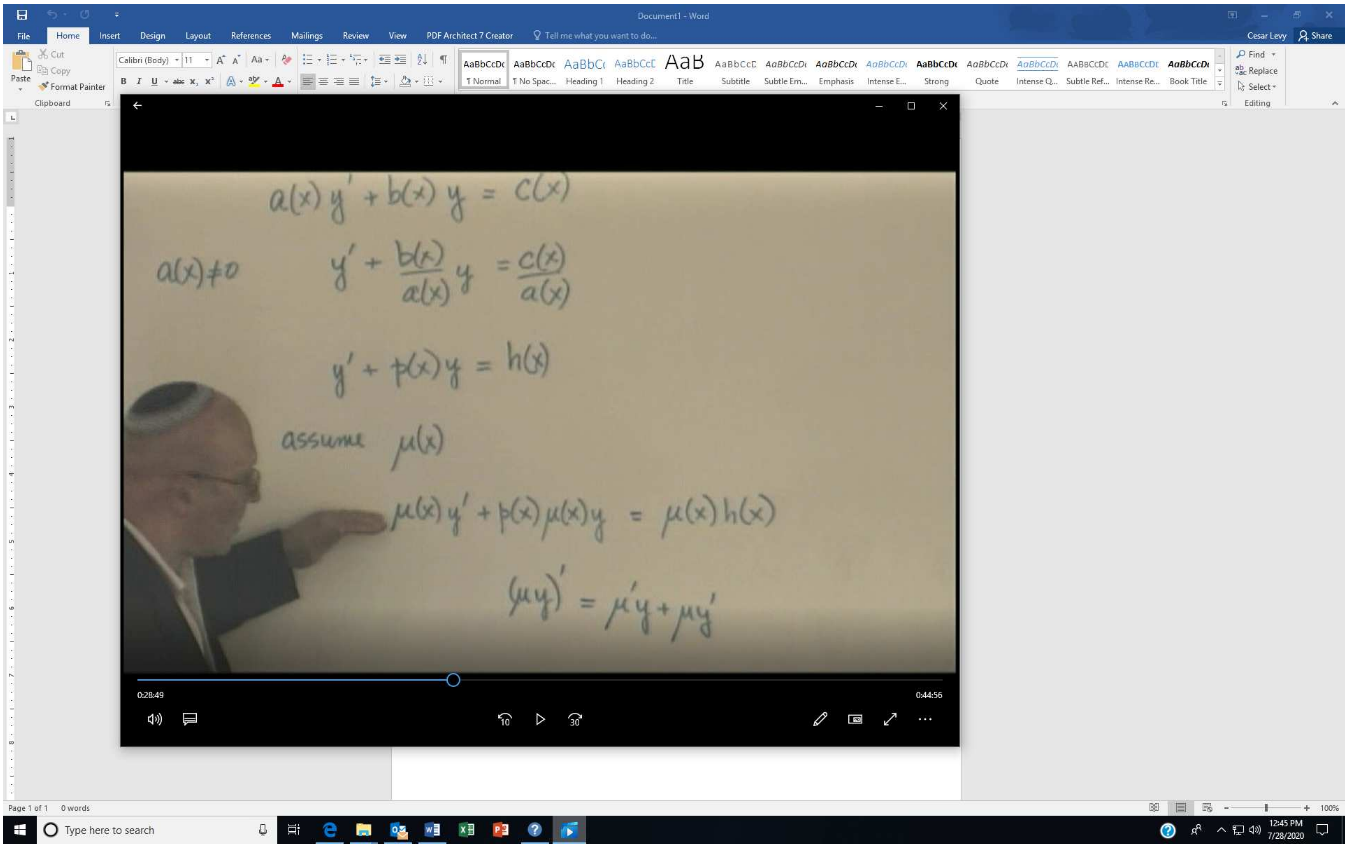
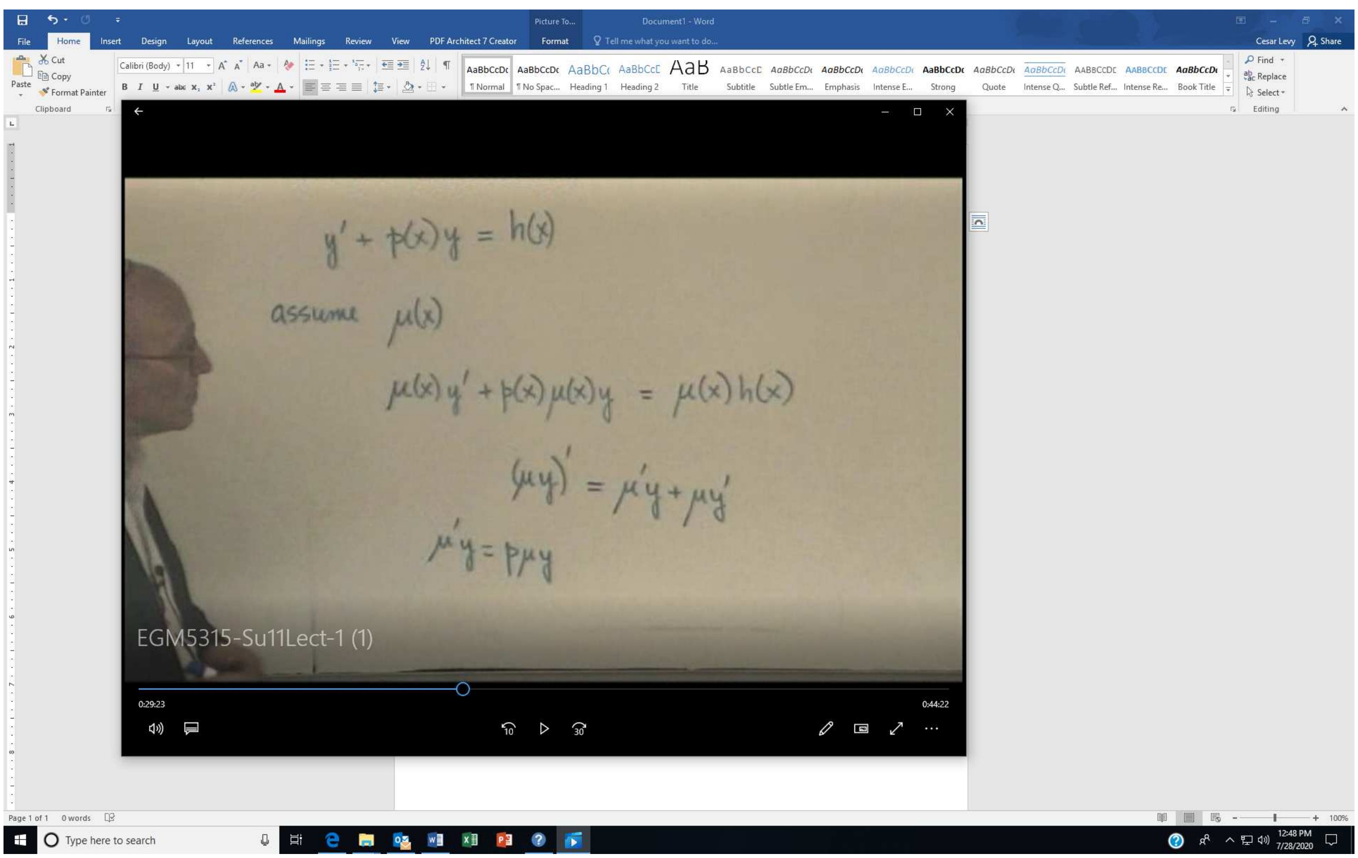
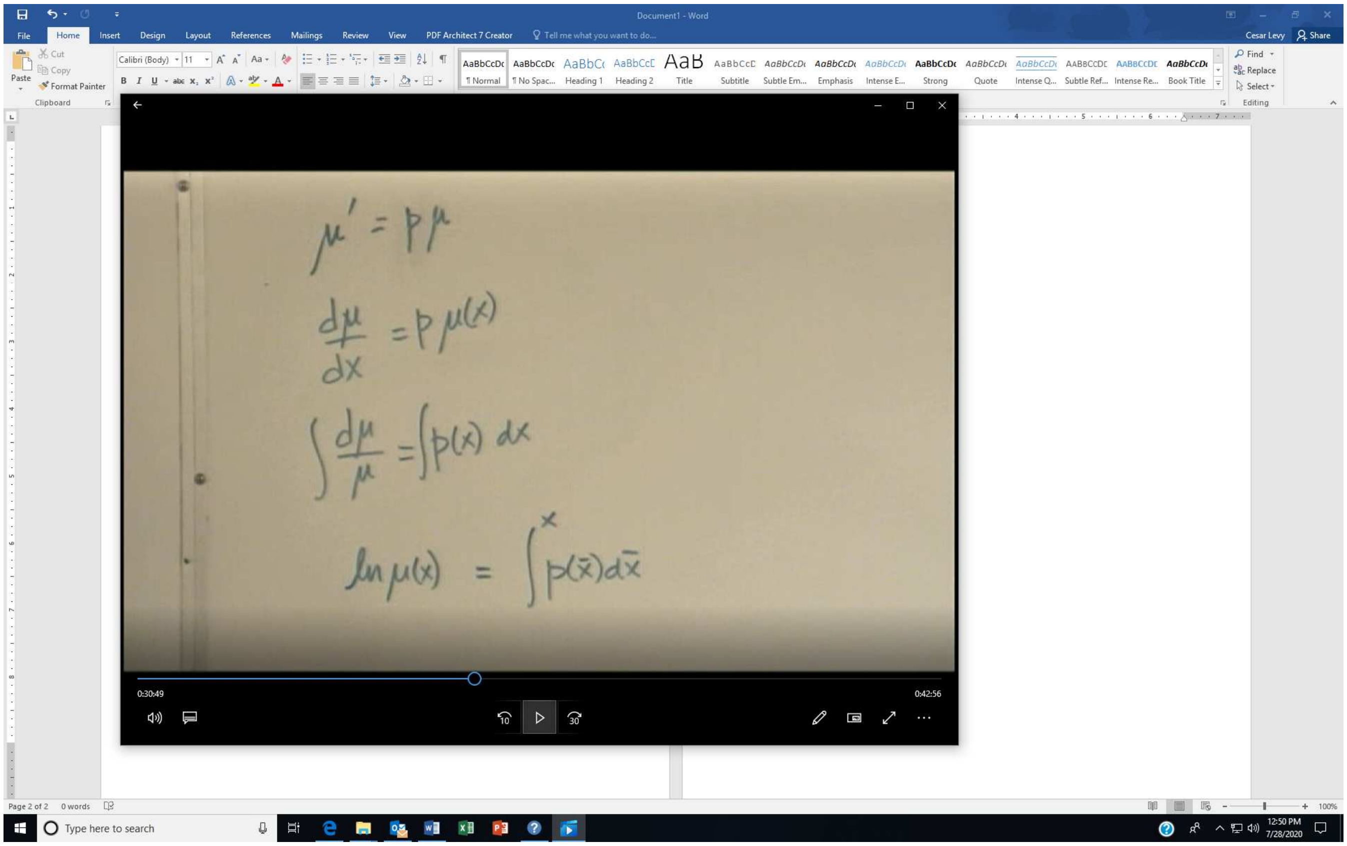
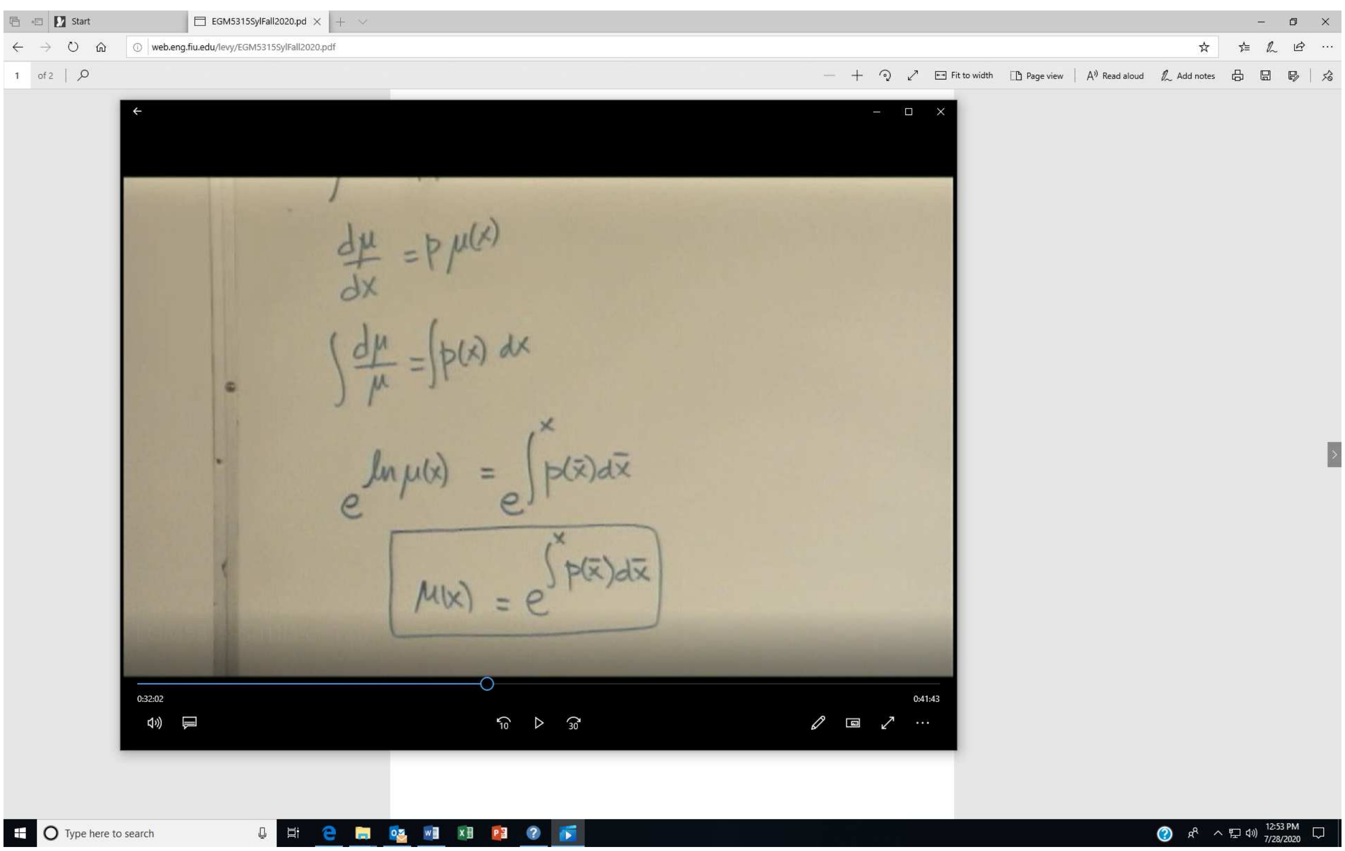
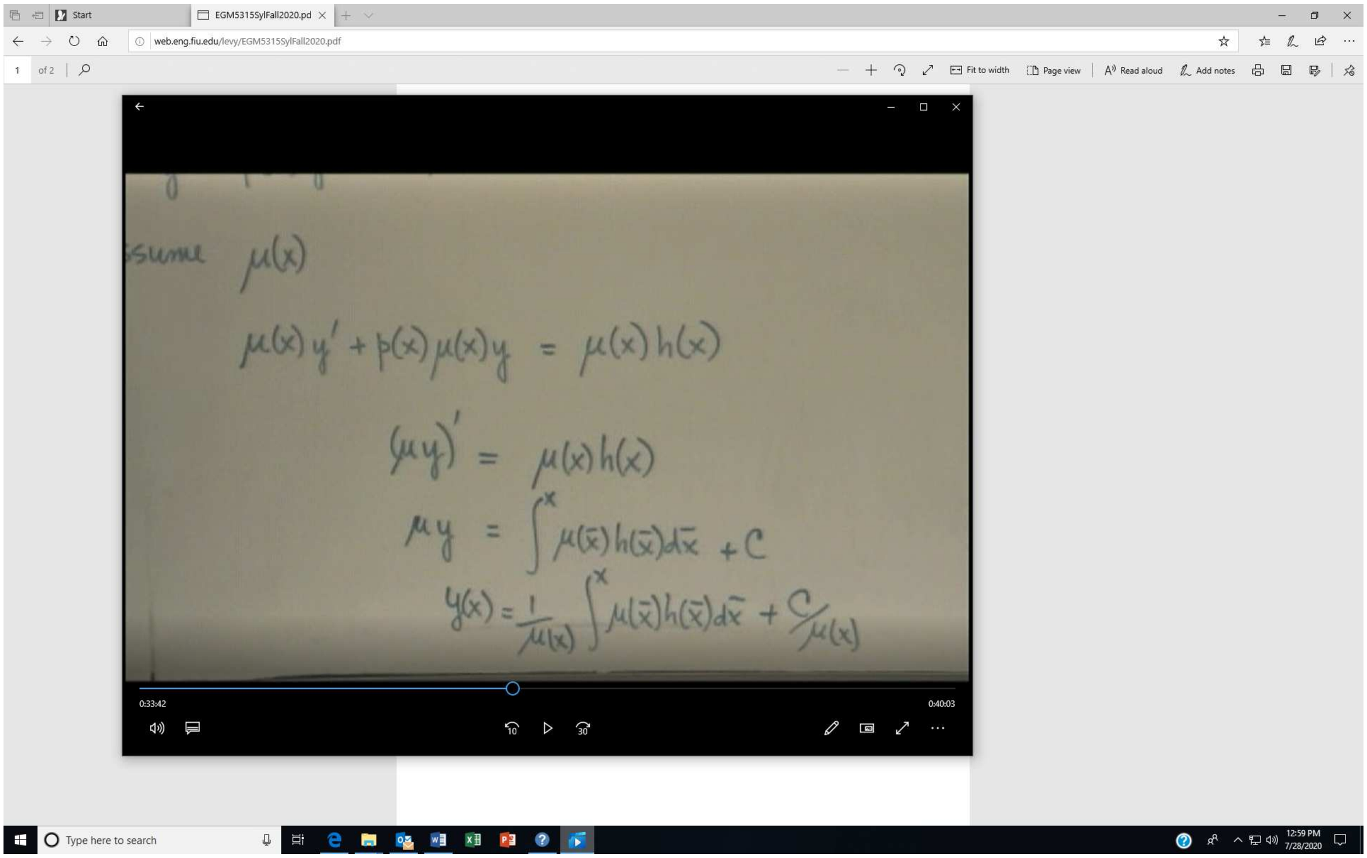

Document1 - Word
a(x) y' + b(x) y = c(x)
a(x)≠0
y' + b(x)/a(x) y = c(x)/a(x)
y' + p(x) y = h(x)
assume μ(x)
μ(x) y' + p(x) μ(x) y = μ(x) h(x)
(μy)' = μ'y + μy'
0:28:49
0:44:56
Type here to search
12:45 PM
7/28/2020

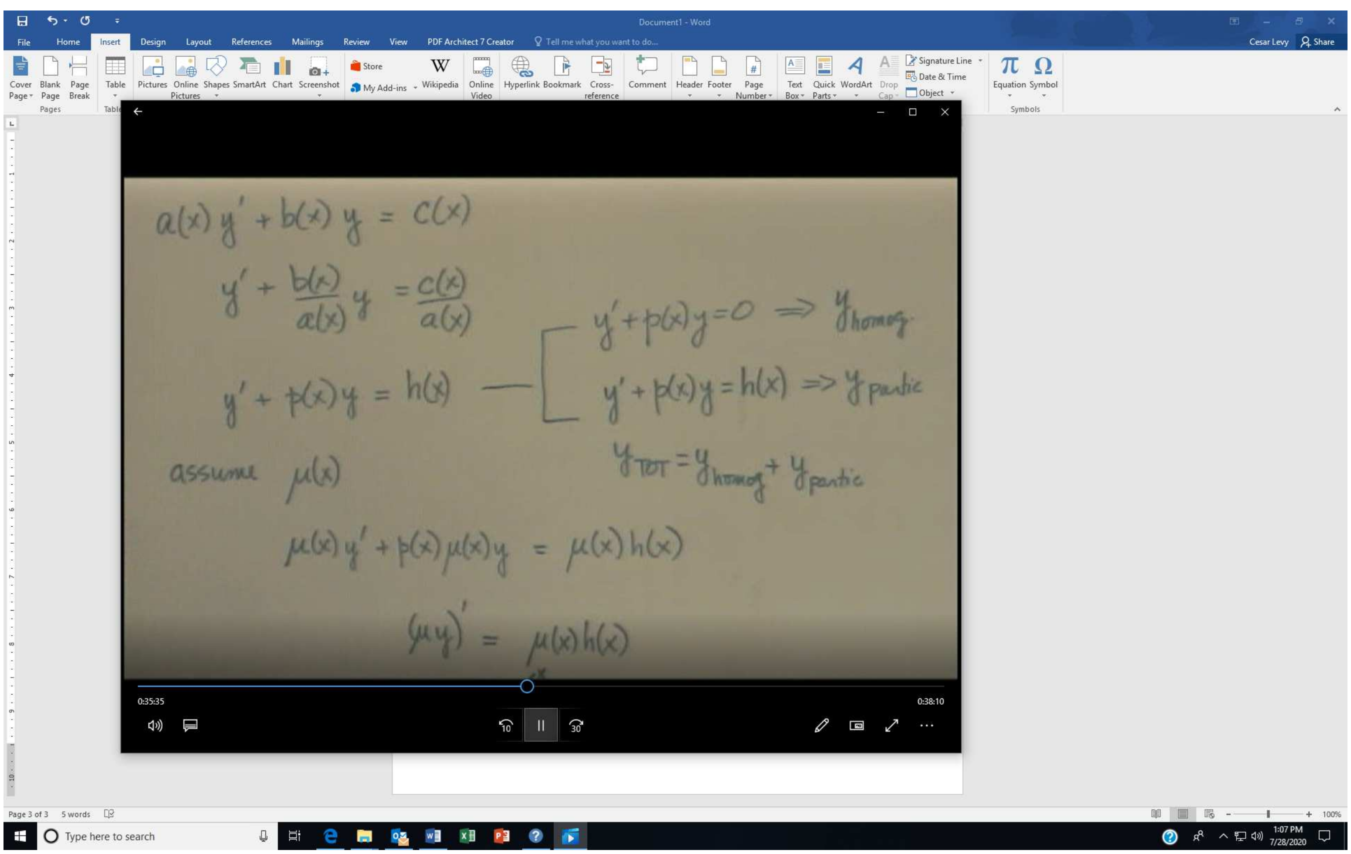

Document1 - Word
y' + p(x) y = h(x)
assume μ(x)
μ(x) y' + p(x) μ(x) y = μ(x) h(x)
(μy)' = μ'y + μy'
μ'y = pμy
EGM5315-Su11Lect-1 (1)
0:29:23
0:44:22
Type here to search
12:48 PM
7/28/2020

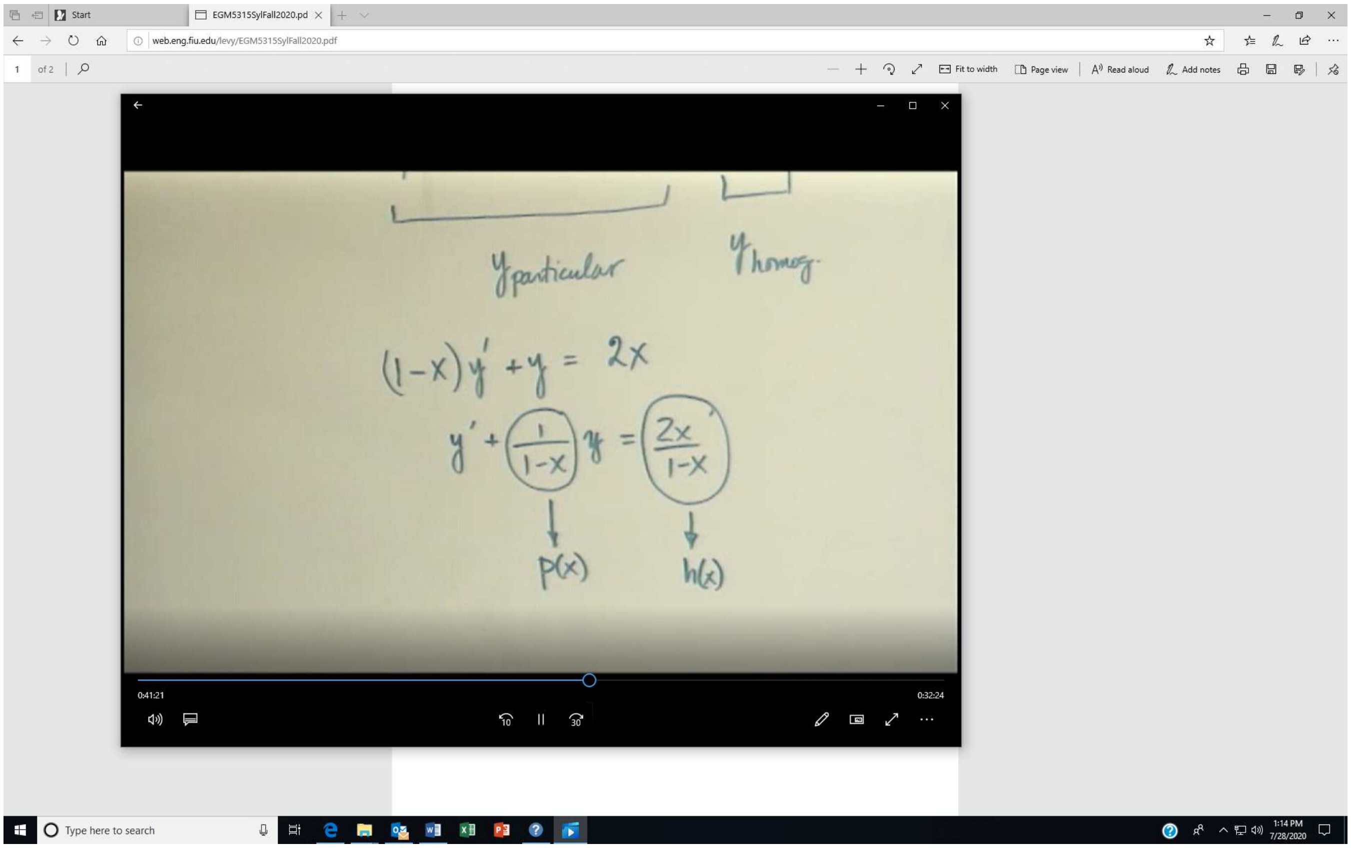




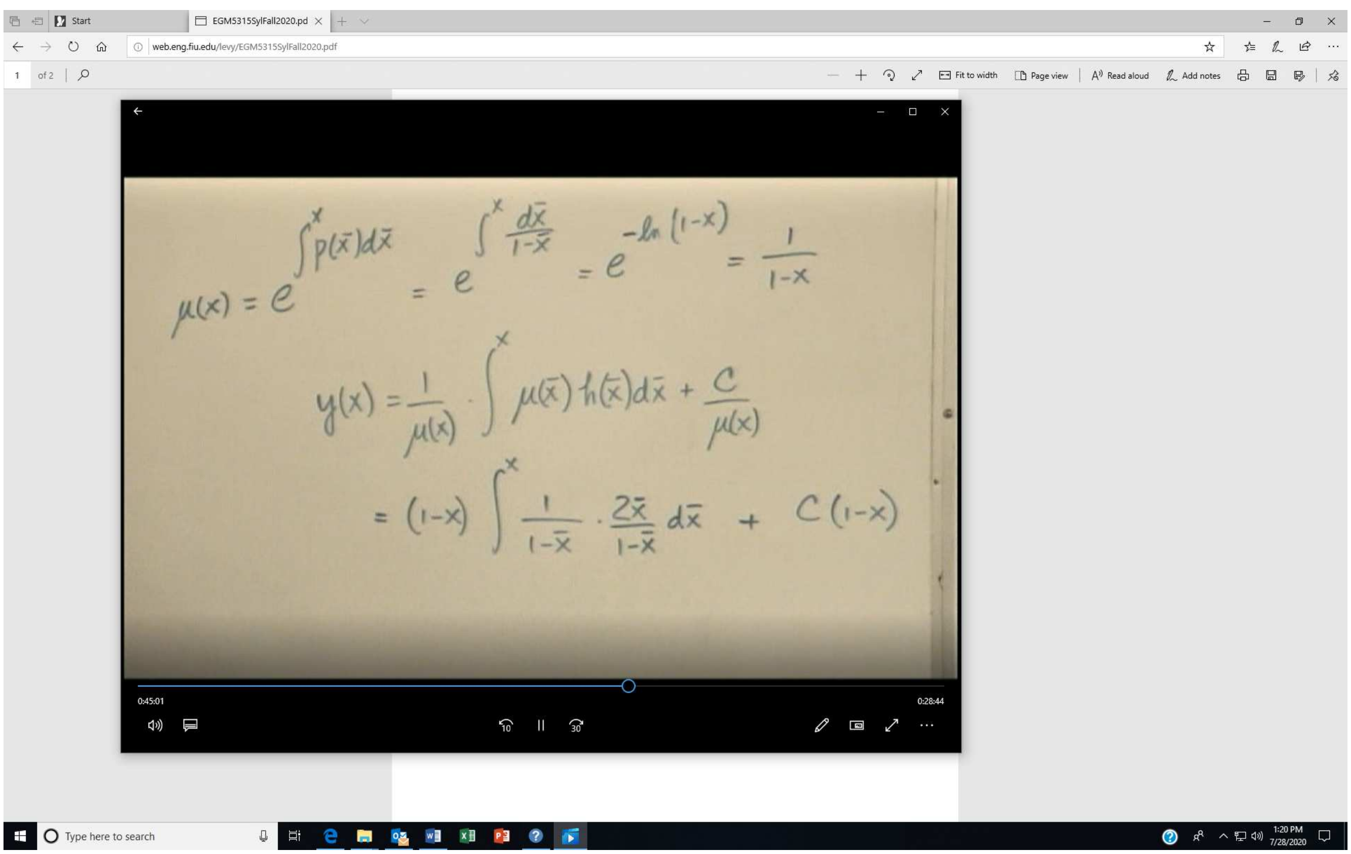
$\mu(x)$ is the integrating factor

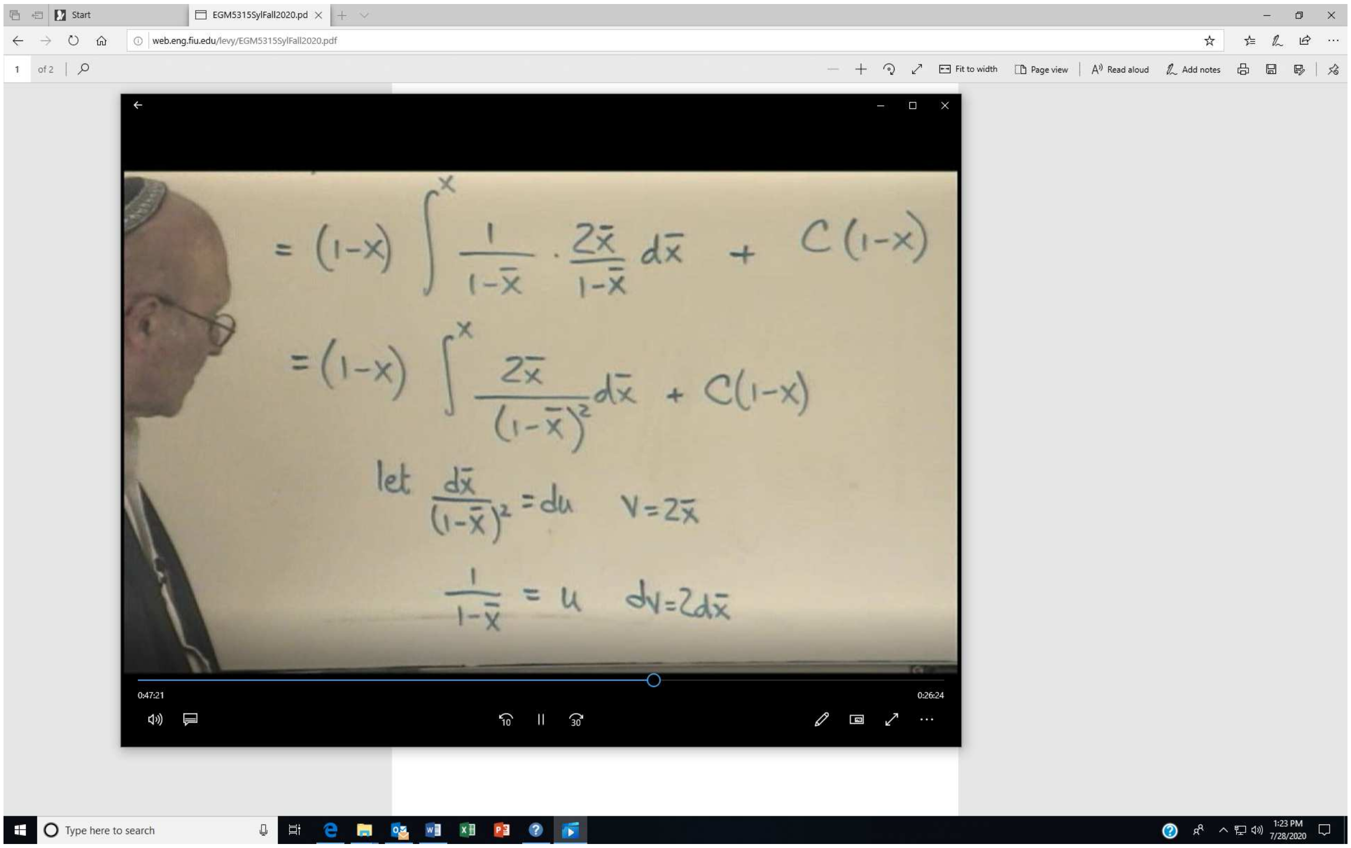

web.eng.fiu.edu/levy/EGM5315SylFall2020.pdf
assume $\mu(x)$
$\mu(x)y' + p(x)\mu(x)y = \mu(x)h(x)$
$(\mu y)' = \mu(x)h(x)$
$\mu y = \int^x \mu(\bar{x})h(\bar{x})d\bar{x} + C$
$y(x) = \frac{1}{\mu(x)}\int^x \mu(\bar{x})h(\bar{x})d\bar{x} + C/\mu(x)$
0:33:42
0:40:03


Document1 - Word
$a(x)y' + b(x)y = c(x)$
$y' + \frac{b(x)}{a(x)}y = \frac{c(x)}{a(x)}$
$y' + p(x)y = h(x)$
$y' + p(x)y = 0 \Rightarrow y_{homog}$
$y' + p(x)y = h(x) \Rightarrow y_{partic}$
$y_{TOT} = y_{homog} + y_{partic}$
assume $\mu(x)$
$\mu(x)y' + p(x)\mu(x)y = \mu(x)h(x)$
$(\mu y)' = \mu(x)h(x)$
0:35:35
0:38:10

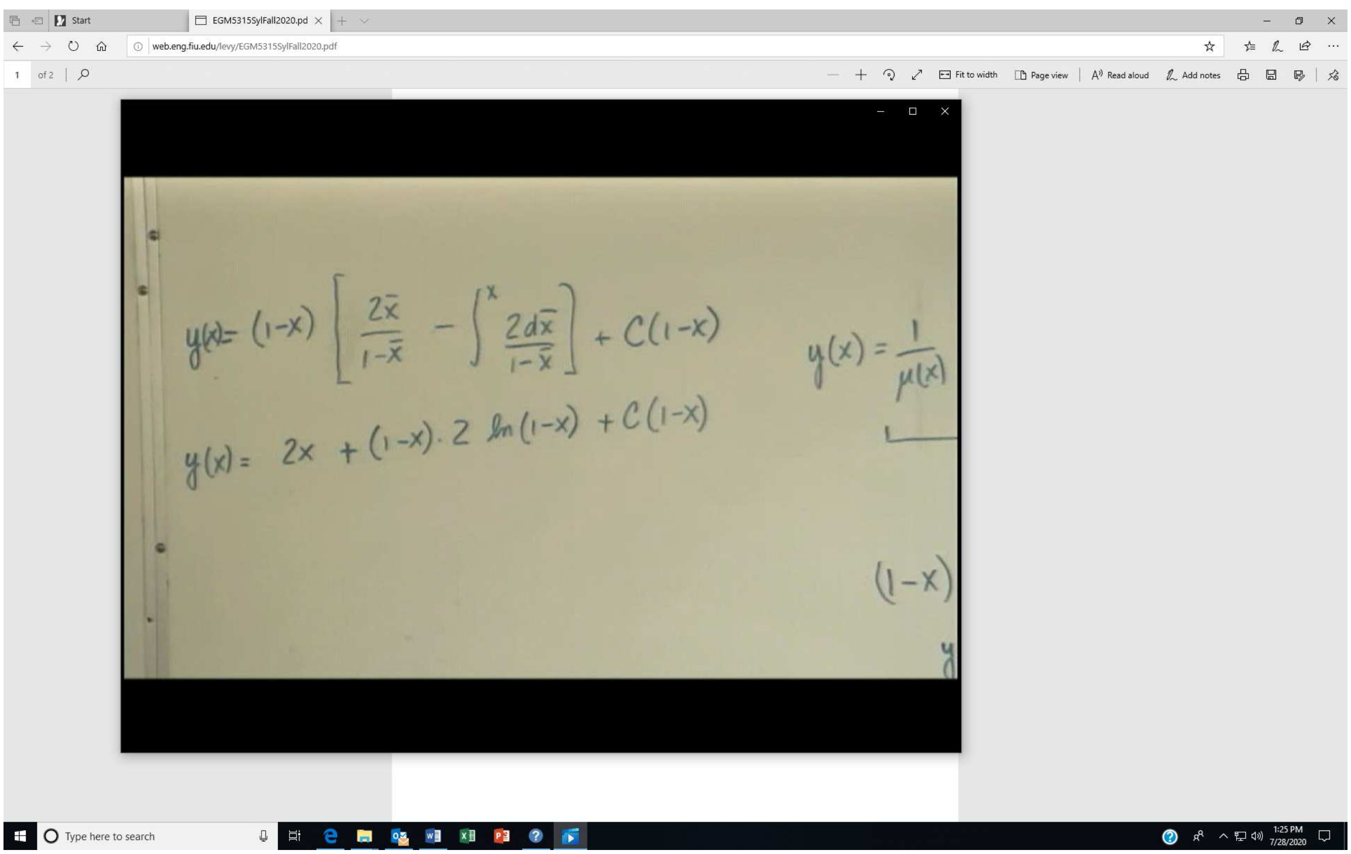


a(x)=1-x, b(x)=1, c(x)=2x ➔ leads to p(x)=b(x)/a(x)=1/(1-x) and h(x)=c(x)/a(x) =2x/(1-x)

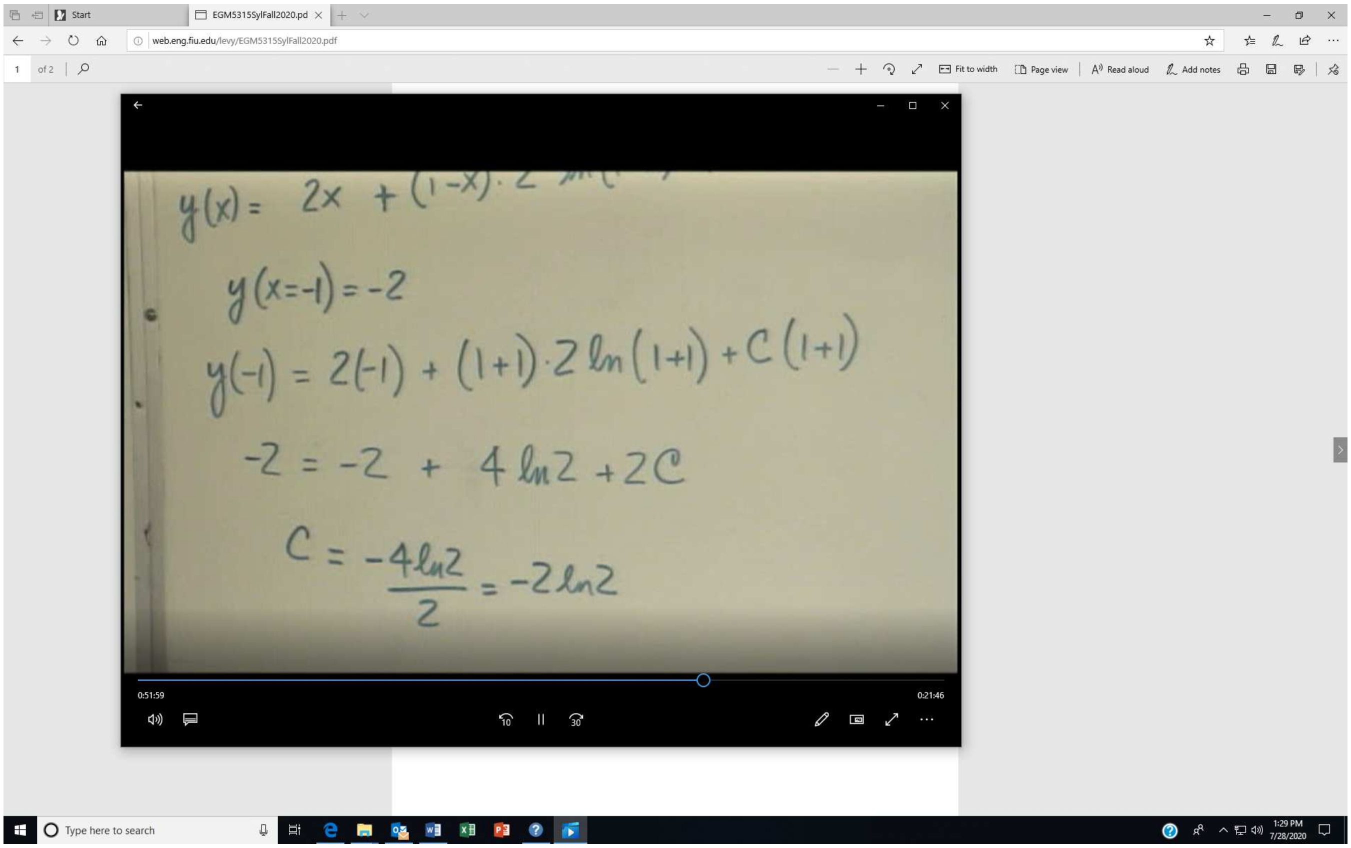




$= (1-x)\int^{x} \frac{1}{1-\bar{x}}\cdot\frac{2\bar{x}}{1-\bar{x}}\,d\bar{x} + C(1-x)$
$= (1-x)\int^{x} \frac{2\bar{x}}{(1-\bar{x})^2}\,d\bar{x} + C(1-x)$
let $\frac{d\bar{x}}{(1-\bar{x})^2} = du$ $\quad v = 2\bar{x}$
$\frac{1}{1-\bar{x}} = u$ $\quad dv = 2d\bar{x}$
0:47:21
0:26:24



$y(x) = (1-x)\left[\frac{2\bar{x}}{1-\bar{x}} - \int^{x}\frac{2d\bar{x}}{1-\bar{x}}\right] + C(1-x)$
$y(x) = \frac{1}{\mu(x)}$
$y(x) = 2x + (1-x)\cdot 2\ln(1-x) + C(1-x)$
$(1-x)$



If we are given the initial condition y(x= -1) = -2, which is needed to evaluate the unknown C, then C=-2 ln 2 =- ln 4