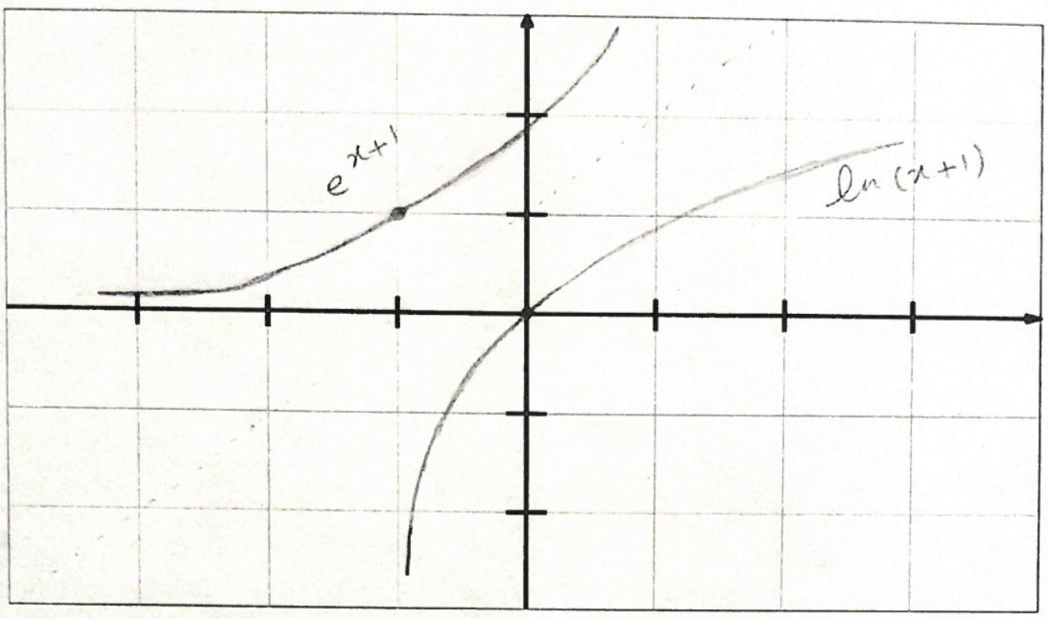
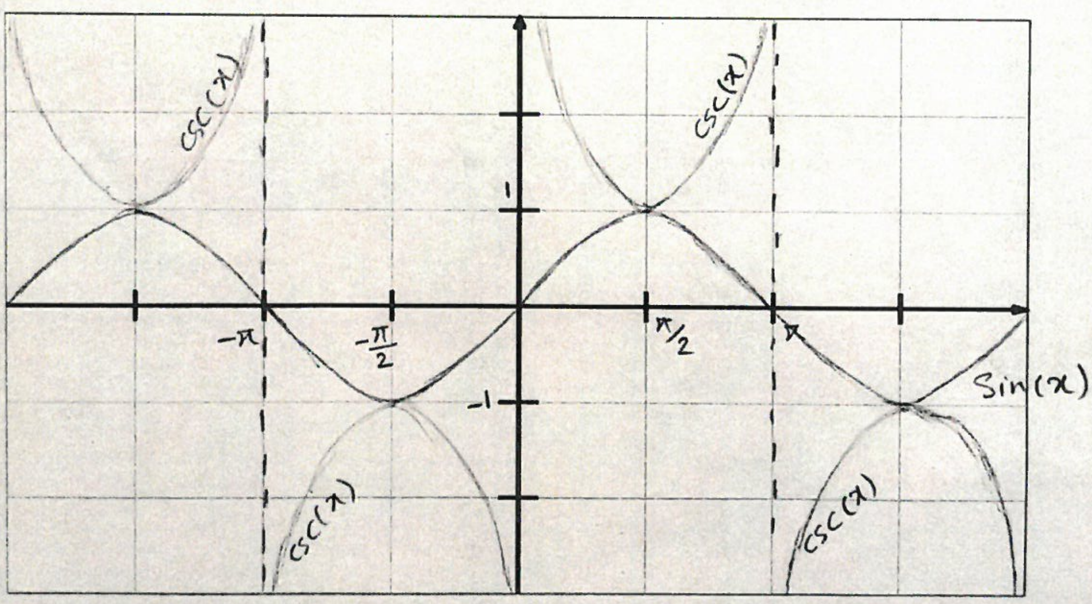
Math 1210: Worksheet #1 **Fall 2017**

Name:	A#:	Section:

[4] 1. In the coordinate system below sketch the graphs of functions $y = e^{x+1}$ and $y = \ln(x+1)$. Make sure that you clearly label the coordinate system and each curve.



[4] 2. In the coordinate system below sketch the graphs of the functions $y = \sin(x)$, $y = \csc(x)$. Make sure that you clearly label the coordinate system and each curve.



[4] 3. Find the equation of the secant line of the curve $y = e^x$ above the interval $[\ln(2), \ln(8)]$. Write the equation in the "slope, y-intercept form" and simplify as much as possible.

$x = \ln(2) \longrightarrow y = e^{\ln(2)} = 2$

$x = \ln(8) \longrightarrow y = e^{\ln(8)} = 8$

$m_{sec} = \frac{f(b) - f(a)}{b - a} = \frac{8 - 2}{\ln(8) - \ln(2)} = \frac{6}{\ln(4)} = \frac{2 \times 3}{\ln(2^2)} = \frac{\cancel{2} \times 3}{\cancel{2} \times \ln(2)} = \frac{3}{\ln(2)}$

$y = \frac{3}{\ln(2)} x + b \longrightarrow 2 = \frac{3}{\cancel{\ln(2)}} \times \cancel{\ln(2)} + b \rightarrow b = -1$

$y = \frac{3}{\ln(2)} x - 1$

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[2] 4. If $f(x) = \ln(x^2 - x + 1)$, $g(x) = e^{x+1}$ and $h(x) = x + 1$, then

$(f \circ g \circ h)(x) = \ln\left(\left(e^{x+2}\right)^2 - e^{x+2} + 1\right)$

[6] 5. Perform the required task and **simplify**.

(a) Write as a sum of summands of the form x^a. $\frac{x^2 + \sqrt[3]{x}}{x^3} = \frac{x^2}{x^3} + \frac{\sqrt[5]{x}}{x^3} = x^{-1} + \frac{x^{1/5}}{x^3}$

$x^{-1} + x^{1/5 - 3} = x^{-1} + x^{-14/5}$

(b) Put on common denominator. $\frac{1}{x+2} + \frac{2}{x} = \frac{x}{x(x+2)} + \frac{2(x+2)}{x(x+2)} =$

$\frac{x + 2x + 4}{x(x+2)} = \frac{3x + 4}{x(x+2)}$

(c) Expand. $(x^2 + x - 3)(x^2 - 2x + 3) = x^4 - 2x^3 + 3x^2 + x^3 - 2x^2 + 3x - 3x^2$

$+ 6x - 9 = x^4 - x^3 - 2x^2 + 9x - 9$

(d) Rationalize and cancel if possible. $\frac{x+2}{\sqrt{x^2+x+7}-3} = \left(\frac{x+2}{\sqrt{x^2+x+7}-3}\right) \times \left(\frac{\sqrt{x^2+x+7}+3}{\sqrt{x^2+x+7}+3}\right)$

$= \frac{(x+2)(\sqrt{x^2+x+7}+3)}{x^2+x+7-9} = \frac{(x+2)(\sqrt{x^2+x+7}+3)}{x^2+x-2} = \frac{(x+2)(\sqrt{x^2+x+7}+3)}{(x+2)(x-1)} = \frac{\sqrt{x^2+x+7}+3}{x-1}$

(e) $\frac{(e^x)^{x-1}e^{x-1}}{e^{2+3x}} = \frac{e^{x^2-x}\, e^{x-1}}{e^{2+3x}}$

$= \frac{e^{x^2-x+x-1}}{e^{2+3x}} = \frac{e^{x^2-1}}{e^{2+3x}} = e^{x^2-1-2-3x} = e^{x^2-3x-3}$

(f) $\ln(3e^{x^3}/5) + \ln(5e^{2x}) - \ln(3e^{x^3}) = \ln\left(\frac{\frac{3e^{x^3}}{5} \times 5e^{2x}}{3e^{x^3}}\right) = \ln\left(e^{2x}\right) = 2x$