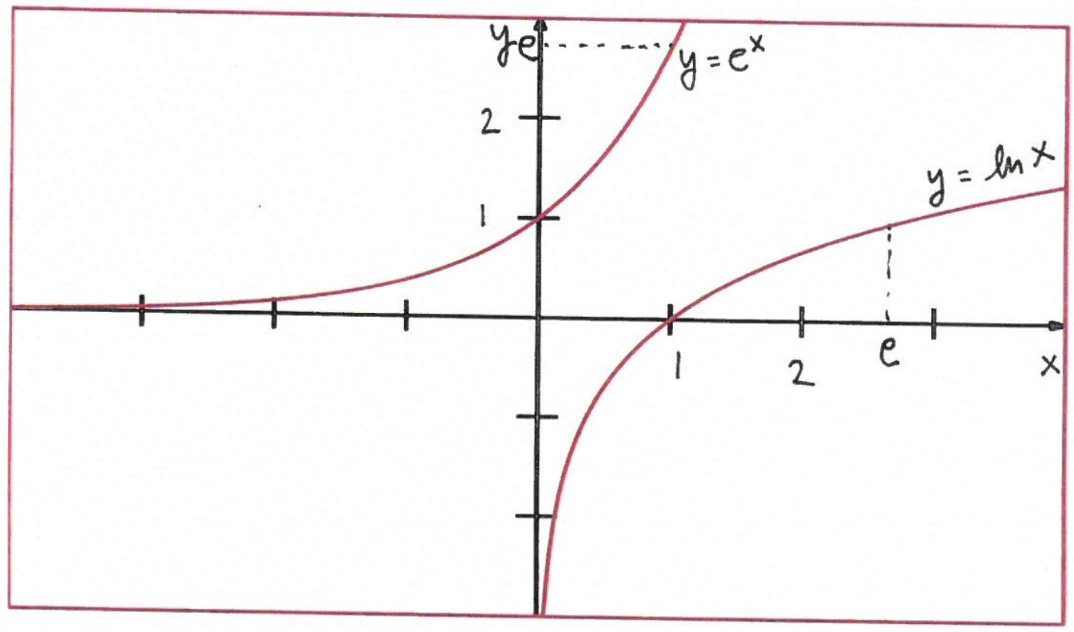
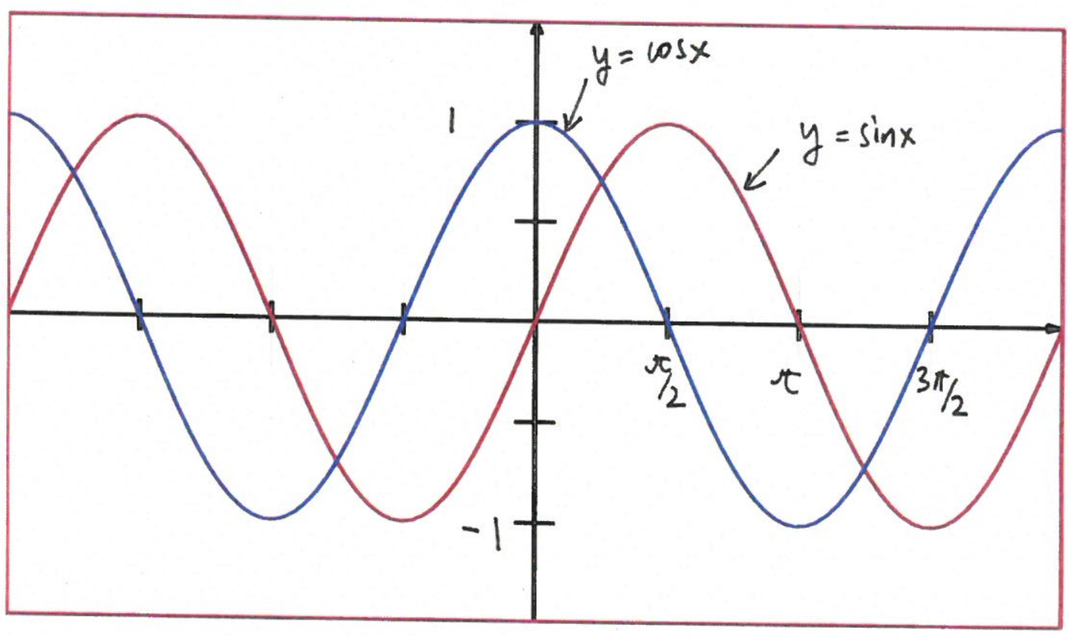
Math 1210: Worksheet #1 **Winter 2017**

Name: SOLUTION	A#:	Section: A,B

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



[4] 3. Find the equation of the secant line to the curve $y = e^x$ on the interval $[\ln(2), \ln(6)]$. Write the equation in the "slope, y-intercept form" and simplify as much as possible.

points : $(\ln 2, 2)$, $(\ln 6, 6)$.

slope $= \dfrac{6-2}{\ln 6 - \ln 2} = \dfrac{4}{\ln 3}$

line : $y - 2 = \dfrac{4}{\ln 3}(x - \ln 2)$

$$\boxed{y = \frac{4}{\ln 3}x - \frac{4\ln 2}{\ln 3} + 2}$$

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

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

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

(a) Write as a sum of summands of the form x^a. $\dfrac{x^2 + \sqrt[5]{x}}{x^3} = \boxed{x^{-1} + x^{-\frac{14}{5}}}$

(b) Put on common denominator. $\dfrac{1}{x-2} - \dfrac{2}{x} = \dfrac{x - 2(x-2)}{x(x-2)} = \boxed{\dfrac{4-x}{x(x-2)}}$

(c) Expand. $(x^2 + x + 3)(x^2 - 2x + 3) = x^4 - 2x^3 + 3x^2 + x^3 - 2x^2 + 3x + 3x^2 - 6x + 9$

$= \boxed{x^4 - x^3 + 4x^2 - 3x + 9}$

(d) Rationalize and cancel if possible. $\dfrac{x+2}{\sqrt{x^2 + x + 7} - 3} = \dfrac{(x+2)(\sqrt{x^2+x+7} + 3)}{x^2+x+7-9}$

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

(e) $\dfrac{(e^x)^{x-1}e^{x-1}}{e^{2-3x}} = e^{x(x-1)+(x-1)-(2-3x)} = e^{x^2-x+x-1-2+3x} = \boxed{e^{x^2+3x-3}}$

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

$= \boxed{2x - x^3}$