Lesson 1 (Review)

Problem 1 Simplify the following expressions

$e^2 \cdot e^3 = e^5$

$(e^2)^3 = e^6$

$e^{-8} \cdot e^m = e^{m-8}$

$\dfrac{e^{2x} e^y}{e^z} = e^{2x+y-z}$

$e^{\ln(5x)} = 5x$

$e^{10-2\ln(5)} = e^{10} e^{-2\ln 5}$

$= e^{10} e^{\ln(5^{-2})}$

$= \frac{1}{25} e^{10}$

Exponent Rules

$x^a \cdot x^b = x^{a+b}$

$(x^a)^b = x^{ab}$

$x^{-a} = \frac{1}{x^a}$

$e^{\ln(x)} = x$

$\ln(e^x) = x$

Problem 2 Express as sums, differences, and multiples of basic logarithmic functions such as $\ln(x)$, $\ln(y)$, and $\ln(z)$

$\ln\left(\frac{xy}{z}\right) = \ln(xy) - \ln(z)$

$= \ln(x) + \ln y - \ln(z)$

$\ln \frac{x^2}{y\sqrt{z}} = \ln x^2 - \ln(y\sqrt{z})$

$= 2\ln x - \ln y + \frac{1}{2}\ln z$

log rules

$\ln(ab) = \ln(a) + \ln(b)$

$\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b)$

$\ln(a^b) = b\ln(a)$

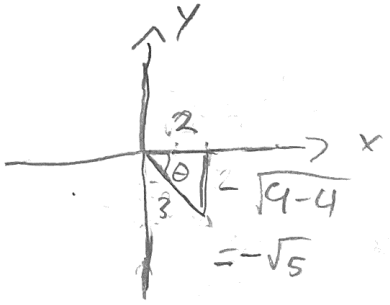
Problem 3 Complete the following trig identities

$\tan x = \frac{\sin x}{\cos x}$ $\quad\quad$ $\cot x = \frac{\cos x}{\sin x}$

$\sec x = \frac{1}{\cos x}$ $\quad\quad$ $\csc x = \frac{1}{\sin x}$

$\sin^2 x + \cos^2 x = 1$

Problem 4 Given $\cos\theta = \frac{2}{3}$ and θ is in the fourth quadrant, find $\sin\theta$, $\cot\theta$ and $\sec\theta$.



$\sin\theta = -\frac{\sqrt{5}}{3}$

$\cot\theta = -\frac{2}{\sqrt{5}}$

$\sec\theta = \frac{3}{2}$