Math 160 Quiz # Name__KMS_____

1. Find the first derivative of each of the following functions:

a. $f(x) = e^x$; $f'(x) = e^x$

b. $g(x) = \ln(x)$; $g'(x) = 1/x$

c. $h(x) = e^{\ln(x)} = x$; $h'(x) = 1$

d. $j(x) = \ln(2e^x) = \ln(2)+\ln(e^x) = \ln(2)+x$; $j'(x) = 1$

e. $k(x) = e^{x^2-x+7}$; $k'(x) = (2x-1)e^{x^2-x+7}$

f. $l(x) = x^2e^x$; $l'(x) = 2xe^x + x^2 e^x = (2x + x^2)e^x$

g. $m(x) = \ln(3x^2 + 5)$; $m'(x) = (6x)/(3x^2 + 5)$

h. $n(x) = \dfrac{3}{1+e^{-2x}}$; $n'(x) = \dfrac{0-3(-2e^{-2x})}{(1+e^{-2x})^2} = 6e^{-2x}/(1+e^{-2x})^2$

2. Find the inflection point of the function $f(x) = x\,e^x$.

$f'(x) = (1+x)e^x$; $f''(x) = (1+x)e^x + e^x = (2+x)\,e^x$.
So the only PIP is $x = -2$.
On $(-\infty, -2)$ f is concave down and on $(-2, \infty)$ it is concave up so the point $(-2, -2/e^2)$ is the only inflection point.