2. (8 pts each) Differentiate the following functions:

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

f(x)=sinh(tan^(-1)e^(2x))

b) $f(x) = \sinh(\tan^{-1} e^{2x})$

f(x)=sqrt(9-x^(2))+3sin^(-1)((x)/(3))

3. (7 pts each) Evaluate the following indefinite integrals:

a) $\int x^2 \cos x \, dx$

int(1+tanh x)/(cosh^(2)x)dx

b) $\int \frac{1 + \tanh x}{\cosh^2 x} \, dx$

intx^(2)cos xdx

c) $\int \frac{dx}{\sqrt{4x - x^2}}$

4. (10 pts each) Evaluate the following definite integrals:

a) $\int_1^{e^2} x \ln \sqrt{x}\, dx$

int_(0)^((pi)/(4))(sin^(3)x)/(sqrt(cos x))dx

b) $\int_0^{\frac{\pi}{4}} \frac{\sin^3 x}{\sqrt{\cos x}}\, dx$

int_(1)^(e^(2))x ln sqrtxdx