

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

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

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

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

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

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

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

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

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

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