Directions: Show all work and simplify your answers.

1. For each function $f(x)$, find $f'(x)$ and $f^{-1}(x)$ or show that it is not one-to-one function.

   a) $f(x) = e^{2x-7}$

   b) $f(x) = \log_{10}(x)$

   c) $f(x) = \ln(4 - x^2)$

2. Evaluate the integral.

   a) $\int \cot(x)\, dx$.

   b) $\int_1^2 \frac{e^{\frac{1}{x}}}{x^2}\, dx$.

c) $\int 2e^{2x}(\tan^2(1+e^{2x})+1)\,dx.$

3. Find the derivative of the given function.

a) $f(x) = (\cos(x))^{\tan^{-1}(x)}$

b) $f(x) = \frac{x^x(3-x)^{\frac{2}{3}}}{\sqrt{\cos(x)}}$

4. Evaluate the integral.

a $\int \frac{4^x}{4^x+5}\,dx.$

b $\int 5^{\tan(x)}(\tan^2(x)+1)\,dx.$