

Homework #1 handout
(due Thursday, January 16)

1. Use the rules of differentiation to find derivatives of the following functions:

a) $f(x) = \sqrt{x} - 4e^{7x} + \tan\left(\frac{x}{3}\right) - 5;$

b) $g(t) = \cos\left(\frac{2t+1}{t^2+9}\right);$

c) $h(w) = w^2 \cdot \tan^3(3w);$

d) $l(x) = \ln(\arcsin(3x)).$

2. Find the following definite or indefinite integrals:

a) $\int (\sqrt{x} - \cos x + 4 \sec^2 x) dx;$

b) $\int \frac{x^2 - 3x + 1}{4x^2} dx;$

c) $\int (e^{3x} - \sin\left(\frac{x}{5}\right) + (11x+3)^{20}) dx;$

d) $\int_0^1 \frac{x}{(x^2+3)^{2020}} dx;$

e) $\int \frac{\sin x}{1 + \cos^2 x} dx;$

f) $\int_0^1 x^2 \sqrt{1-x^3} dx.$