(Problems selected from worksheets by Rob Bayer and from Stewart's *Calculus*)

(1) Integrate each of the following:

(a) $\int e^{x+e^x}\,dx$.

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

(c) $\int \dfrac{t^3+1}{t^3-t^2}\,dt$.

(d) $\int \sqrt{\dfrac{x-1}{x+1}}\,dx$.

(e) $\int \dfrac{dt}{\sqrt{e^t}}$.

(f) $\int \cos^3(2x)\sin(2x)\,dx$

(2) Find $\frac{dy}{dx}$ using implicit differentiation.

(a) $x^3 + y^3 = 1$.

(b) $x^2y^2 + x\sin y = 4$.

(c) $2\sqrt{x} + \sqrt{y} = 3$.

(d) $\sin x + \cos y = \sin x \cos y$.

(e) $e^{x/y} = x - y$.

(f) $y\sin(x^2) = x\sin(y^2)$.

(3) Find y'' in terms of x and y using implicit differentiation.

(a) $9x^2 + y^2 = 9$.

(b) $y' = x^2y^2 + 5e^y$.

(c) $\sqrt{x} + \sqrt{y} = 1$.

(d) $y' + xy = x^2$.