MATH 320, Spring 2013, Assignment 3
Textbook Questions

Section 1.6 Find the general solution of the following differential equations:

#10 $xyy' = x^2 + 3y^2$

#15 $x(x+y)y' + y(3x+y) = 0$

#23 $xy' + 6y = 3xy^{4/3}$

#24 $2xy' + y^3e^{-2x} = 2xy$

Verify that the given differential equation is exact, then solve it:

#35 $\left(x^3 + \dfrac{y}{x}\right)dx + (y^2 + \ln(x))dy = 0$

#38 $(x + \arctan(y))dx + \left(\dfrac{x+y}{1+y^2}\right)dy = 0$

#56 Suppose that $n \neq 0$ and $n \neq 1$. Show that the substitution $v = y^{1-n}$ transforms the Bernoulli equation $dy/dx + P(x)y = Q(x)y^n$ into the linear equation

$$\frac{dv}{dx} + (1-n)P(x)v(x) = (1-n)Q(x).$$