

## Some Substitution Methods and Exact Equations- HW Problems

In problems 1-3 show the equation is exact and find the general solution to the differential equation.

1.  $(2x^2 - 3y^2)dx + (y^2 - 6xy)dy = 0$

2.  $(\cos(x) + \ln(y))dx + \left(\frac{x}{y} + e^y\right)dy = 0$

3.  $\left(x^3 + \frac{y}{x}\right) + (y^2 + \ln(x))\frac{dy}{dx} = 0.$

In problems 4-6 find the general solution to the differential equation.

4.  $xy' = y + 2\sqrt{xy}$

5.  $(xy)y' - x^2 - y^2 = 0$

6.  $x^2y' = xy + y^2$

In problems 7 and 8 find the general solution by reducing the order of the differential equation.

7.  $y'' = 2(y')^2$

8.  $x^2y'' + 4xy' = 1$