MA114 Summer II 2017
Worksheet – Separable and Linear Equations
7/31/17

1. Use separation of variables to find the general solutions to the following differential equations.

   a) $y' + 4xy^2 = 0$

   b) $\sqrt{1-x^2}y' = xy$

   c) $(1+x^2)y' = x^3y$

   d) $\sqrt{1+y^2}y' + \sec(x) = 0.$

2. Find the integrating factor $I(x) = e^{\int A(x)dx}$ for the following first-order linear differential equations.

   a) $(\sin x)y' = (\cos x)y + 1$

   b) $y' + \dfrac{1}{x+1}y = x^{-2}$

   c) $e^{2x}y' = 1 - e^x y$

   d) $xy' = x^{-2} - \dfrac{3y}{x}$

3. Solve the initial value problems.

   a) $y' + 3y = e^2 x, y(0) = -1$

   b) $\dfrac{dP}{dt} = \sqrt{Pt}, P(1) = 2$

   c) $x\dfrac{dy}{dx} + y = e^x, y(1) = 3$