## MA 114 Worksheet #28: Separable equations

- 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. (Extra) A tank has the shape of the parabola  $y = x^2$  revolved about the x-axis. water leaks from a hole of area  $B = 0.0005 m^2$  at the bottom of the tank. Let y(t) be the water level at time t. How long does it take for the tank to empty if the initial water level is y(0) = 1 m?