MAT 303: Assignment 1

Find the general solutions *(express y as a function of x in the first three problems)*

1. (a) $y' = x(y+1)$
   (b) $y' = \dfrac{x^2-1}{2x+xy}$
   (c) $y' = y\log(y)\cot(x)$
2. (a) $y' - 2xy = e^{x^2}$
   (b) $y' + \dfrac{3}{x}y = \dfrac{\sin(x)}{x^3}$
   (c) $y' - \dfrac{2x}{x^2+1}y = 1$
3. (a) $y' + xy = \dfrac{x}{y^3}$
   (b) $(1-x^3)y' - 2(1+x)y = y^{5/2}$
4. (a) $y' = \dfrac{\sqrt{x^2-y^2}+y}{x}$
   (b) $y' = \dfrac{xy^2-2x^3}{2x^2y+y^3}$
5. (a) $\left(x^3 + xy^2\sin(2x) + y^2\sin^2(x)\right)dx + 2xy\sin^2(x)dy = 0$
   (b) $\left(e^x - \sin(y)\right)dx + \cos(y)dy = 0$
   (c) $xy\,dx + (1+x^2)dy = 0$