Directions: Do what it says.

1. Find the general solution to the differential equation.

a. $\frac{dy}{dx} = \frac{xy}{x^2+1}$

b. $\frac{dy}{dx} = y^2 \sin(x)$

c. $\frac{dy}{dx} = \frac{e^x}{y\sqrt{1+y^2}}$

2. Find the particular solution to the differential equation given the initial condition. State the interval of validity.

a. $\frac{dy}{dx} = 2xy$ and $y = 3$ when $x = 0$

b. $\frac{dy}{dx} = \cos^2(y)$ and $y = 0$ when $x = 0$

c. $\frac{dy}{dx} = \frac{4\sqrt{y}\ln x}{x}$ and $y = 1$ when $x = e$

d. $\frac{dy}{dx} = 4x^3 \tan(y)$ and $y = \frac{\pi}{2}$ when $x = 1$

e. $\frac{dy}{dx} = \frac{2x+\sec^2(x)}{2y}$; $y(0) = -5$