Differential Equations, Spring 2016 Quiz 2, Sep 9

Name: _____ Section: _____

You must show all your work to receive credit. Calculators are allowed.

Problem 1: (3 points) Solve the IVP

$$7x - 4y\sqrt{x^2+1}\frac{dy}{dx} = 0, \qquad y(0) = -2.$$

Solution: separate vairables

$$4y\,\mathrm{d}y = \frac{7x}{\sqrt{x^2+1}}\,\mathrm{d}x$$

$$\int 4y\,\mathrm{d}y = \int 7x(x^2+1)^{-1/2}\,\mathrm{d}x$$

$$2y^2 = 7(x^2+1)^{1/2} + C$$

$$y^2 = \frac{7}{2}(x^2+1)^{1/2} + C$$

$$y = -\sqrt{\frac{7}{2}(x^2+1)^{1/2} + C}$$

note: need to take $-\sqrt{}$ because of IC

$$-2 = y(0) = -\sqrt{\frac{7}{2}(0^2+1)^{1/2} + C} \implies C = 4 - 7/2 = 1/2$$

$$y = -\sqrt{\frac{7}{2}(x^2+1)^{1/2} + \frac{1}{2}}$$