Name: [1 pt]

Problem 1. Find the derivative of the function $f(x) = \dfrac{1}{\sqrt{2x+1}}$. [5 pts]

$$f(x) = \frac{1}{(2x+1)^{1/2}}$$

$$\Rightarrow \quad f(x) = (2x+1)^{\frac{-1}{2}}$$

$$\Rightarrow \quad f'(x) = \frac{-1}{2}(2x+1)^{\frac{-1}{2}-1} \cdot \frac{d}{dx}(2x+1)$$

$$= \frac{-1}{2}(2x+1)^{-3/2} \cdot 2$$

$$= \frac{-1}{(2x+1)^{3/2}} = \frac{-1}{(2x+1)\sqrt{2x+1}}$$

Problem 2. Differentiate implicitly to find $\dfrac{dy}{dx}$ if $x^2 - xy + y^2 = 1$. [5 pts]

$$(x^2)' - (xy)' + (y^2)' = (1)'$$

$$(x^2)' = 2x$$

$$(xy)' = y + x\frac{dy}{dx} \quad \text{[Product rule]}$$

$$(y^2)' = 2y\frac{dy}{dx}$$

$$(1)' = 0$$

$$\Rightarrow \quad 2x - y - x\frac{dy}{dx} + 2y\frac{dy}{dx} = 0$$

$$\Rightarrow \quad (2y - x)\frac{dy}{dx} = y - 2x$$

$$\Rightarrow \quad \frac{dy}{dx} = \frac{y-2x}{2y-x}$$