3) $cx^2y \qquad x^2=y \qquad [0:1]$

$$\int_0^1 \int_{x^2}^1 cx^2y\,dy\,dx = 1 = c\int_0^1 \frac{x^2(1-x^4)}{2}\,dx$$

$$\Rightarrow \frac{2c}{21} = 1 = c = \frac{21}{2} \qquad \frac{21}{2}x^2y$$

a) $P(X>Y) =$

$$\int_0^1 \int_{x^2}^{x} \frac{21}{2}x^2y\,dy\,dx = \frac{3}{10}$$

b) $f_{Y|X=x}(y) =$ $\qquad f(x) = \int_0^1 \frac{21}{2}x^2y\,dx \Rightarrow \frac{21}{2}y\,\frac{x^3}{3}\Big|_0^1 = \frac{21}{2}y \cdot \frac{1}{3}$

$$\frac{\frac{21}{2}x^2y}{\frac{21}{6}y} \;//$$