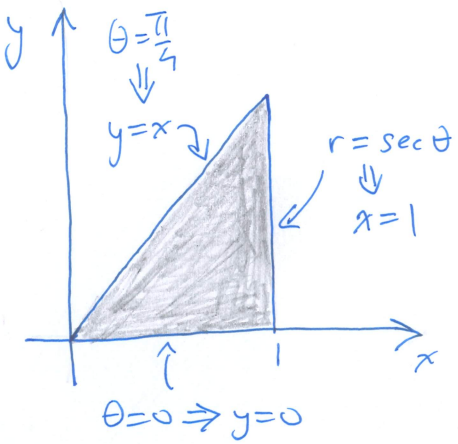
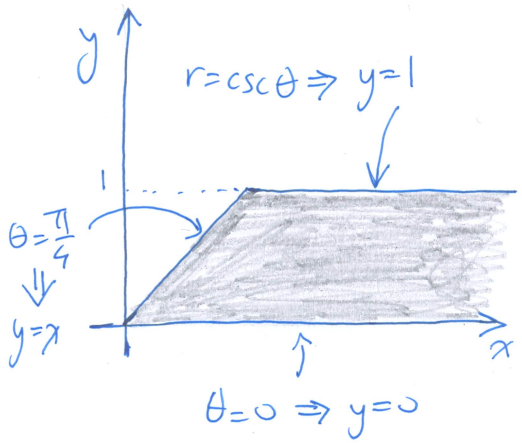
1. In each of the following, a double integral $\iint_D f(x,y)\,dA$ is expressed as an iterated integral in polar coordinates. In each part, draw a picture of the region D, and clearly label the curves bounding it with their equations both in Cartesian and polar coordinates.

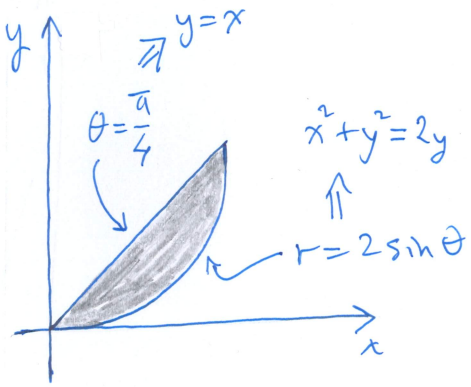
a. $\displaystyle\int_0^{\pi/4}\int_0^{\sec\theta} f(r\cos\theta, r\sin\theta)\, r\, dr\, d\theta$



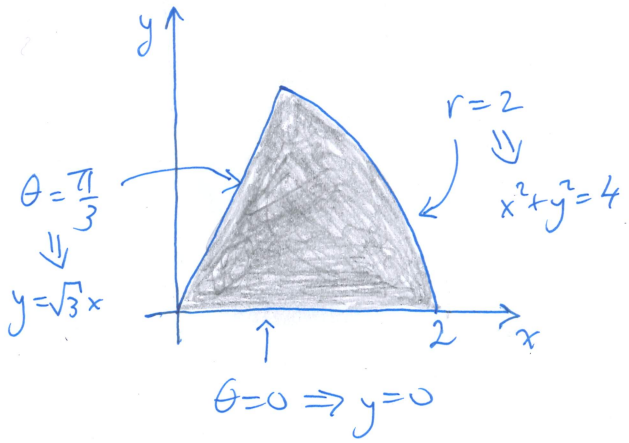
b. $\displaystyle\int_0^{\pi/4}\int_0^{\csc\theta} f(r\cos\theta, r\sin\theta)\, r\, dr\, d\theta$



c. $\displaystyle\int_0^{\pi/4}\int_0^{2\sin\theta} f(r\cos\theta, r\sin\theta)\, r\, dr\, d\theta$



d. $\displaystyle\int_0^{\pi/3}\int_0^{2} f(r\cos\theta, r\sin\theta)\, r\, dr\, d\theta$



e. $\displaystyle\int_0^{1}\int_{\arccos r}^{\pi} f(r\cos\theta, r\sin\theta)\, r\, d\theta\, dr$