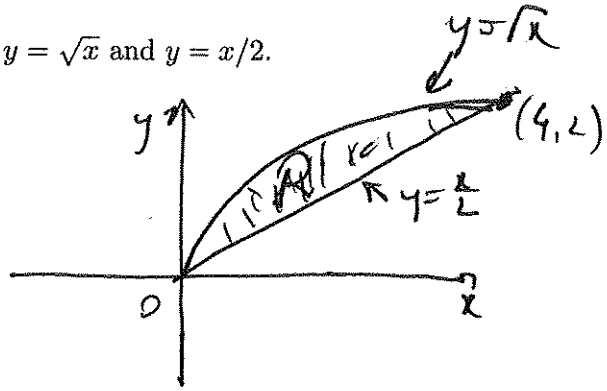
Name: Solution key **Panther ID:** _____

Quiz 11/7 MAC-2313 Fall 2017

1. (6 pts) Let R be the region in the first quadrant bounded by $y = \sqrt{x}$ and $y = x/2$.

(a) (2 pts) Sketch the region R in the xy-plane.



(b) (2 pts) Fill in the missing limits of integration:

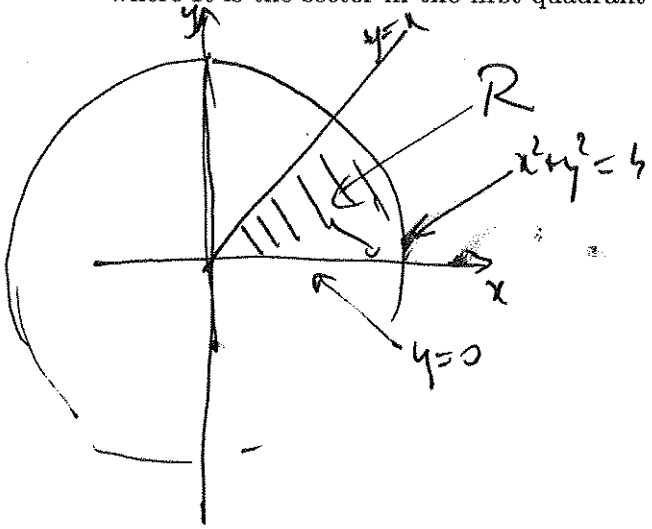
$$\int_R\int f(x,y)\,dA = \int_{x=0}^{x=4}\int_{y=\frac{x}{2}}^{y=\sqrt{x}} f(x,y)\,dy\,dx$$

(c) (2 pts) Fill in the missing limits of integration:

$$\int_R\int f(x,y)\,dA = \int_{y=0}^{y=2}\int_{x=y^2}^{x=2y} f(x,y)\,dx\,dy$$

2. (6 pts) Use polar coordinates to evaluate $\int_R\int \frac{1}{1+x^2+y^2}\,dA$,

where R is the sector in the first quadrant bounded by $y = 0$, $y = x$ and $x^2 + y^2 = 4$.



$$\iint_R \frac{1}{1+x^2+y^2}\,dA = \int_{\theta=0}^{\theta=\frac{\pi}{4}}\int_{r=0}^{r=2} \frac{1}{1+r^2}\,r\,dr\,d\theta$$

$$= \int_{\theta=0}^{\theta=\frac{\pi}{4}} \frac{1}{2}\ln(1+r^2)\Big|_{r=0}^{r=2}\,d\theta$$

$$= \frac{1}{2}(\ln 5 - \ln 1)\cdot\frac{\pi}{4} = \boxed{\frac{\pi\cdot\ln 5}{8}}$$