

### Homework/ Double Integrals

**Q1/** Evaluate the integral:

$$\int_0^{3a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy dx$$

by changing the order of integration.

**Q2/** Evaluate the integral:

$$\int_0^{1.57} \int_x^{\sqrt{9-x^2}} dy dx$$

by changing the order of integration.

**Q3/** Compute the double integral:

$$\iint_R (x + y) dA$$

if R is the region bounded by the line  $x + y = 2$  and parabola  $y = x^2$ .

**Q4/** Compute the area outside the cardioid  $r = 4 - 4 \sin(\theta)$  and inside the circle  $r=2$ .

**Q5/** Compute the area outside the lemniscate  $r^2 = 4 \cos(2\theta)$  and inside the circle  $r=1$ .

**Q6/** Evaluate:

$$\iint_D (x + y) dA$$

Over the region D enclosed between  $y = \frac{1}{2}x$  ,  $y = \sqrt{x}$  ,  $x = 2$ , and  $x = 4$

**Q6/** Evaluate the integral:

$$\int_0^1 \int_{-\sqrt{x}}^{\sqrt{x}} \sin(y^3) dy dx$$