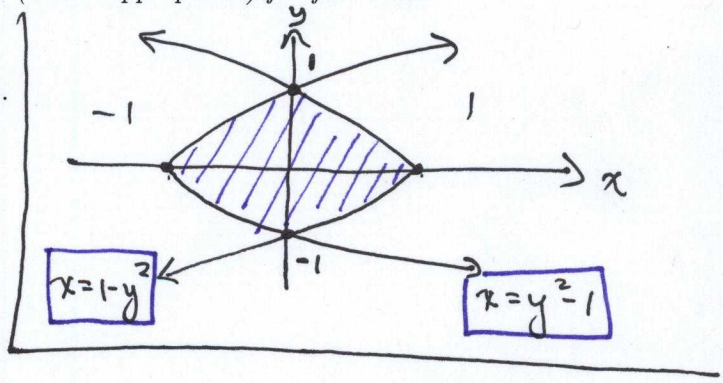
Math 172-Quiz 1 **NAME:** Key

Instructions: *Show at least one step of your work (where appropriate) for full credit.*

1. Compute the area of the region to your right.



$$A = \int_{-1}^{1} ((1-y^2)-(y^2-1))\,dy$$

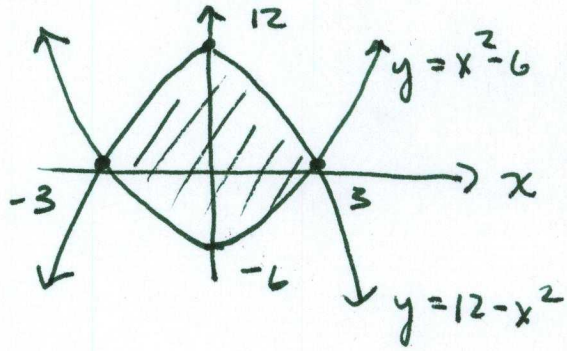
$$= \int_{-1}^{1} (2-2y^2)\,dy$$

$$= \left(2y - \frac{2y^3}{3}\right)\Big|_{-1}^{1} = 2 - \frac{2}{3} - \left(-2 + \frac{2}{3}\right)$$

$$= 4 - \frac{4}{3}$$

$$= \frac{8}{3}.$$

2. Provide a plot of the region bounded by the two curves $y = 12 - x^2$ and $y = x^2 - 6$ and compute it's area.



$$12 - x^2 = x^2 - 6$$

$$2x^2 = 18$$

$$x^2 = 9$$

$$x = \pm 3$$

$$A = \int_{-3}^{3} ((12-x^2)-(x^2-6))\,dx$$

$$= \int_{-3}^{3} (-2x^2+18)\,dx$$

$$= \left(-\frac{2x^3}{3} + 18x\right)\Big|_{-3}^{3} = -\frac{54}{3} + 54 - \left(+\frac{54}{3} - 54\right)$$

$$= 108 - \frac{108}{3} = 108 - 36 = \boxed{72}$$