

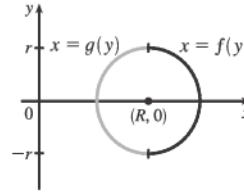
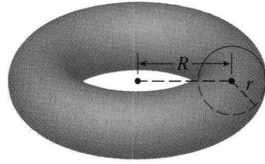
Calculus Quiz 16

1. (5 pts)

a. Find the area of the region bounded by four parabolas $x^2 = y$, $x^2 = 2y$, $y^2 = 3x$, $y^2 = 4x$.

b. Find the total area under the curve $\frac{x \tan^{-1} x}{(1 + x^2)^2}$ for $x > 0$.

2. (5 pts) We can evaluate the volume of a solid torus (the donut-shaped solid shown in the figure) by complete the following steps.



- a. The torus is obtained by rotating the circle $(x - R)^2 + y^2 = r^2$ about the y -axis. By slicing the torus through y , we get the cross-section $A(y)$ as annular region. Determine the cross-section function $A(y)$.
- b. Evaluate the volume V as the definite integral $V = \int_{-r}^r A(y) dy$.