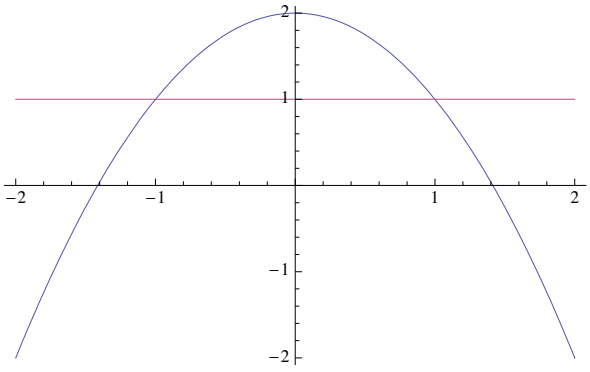
B3.

MATH 1700: Test #3 (Fall 2008)

Solutions

[9] **1.** Find the area of the region bounded by the curves $y=-x^2+2$ and $y=1$. Sketch *R*.



Solution: Solving $y=-x^2+2$ and $y=1$ gives $x=-1$ and $x=1$. So, the area is $\int_{-1}^{1}[(-x^2+2)-1]dx=2\int_{0}^{1}(-x^2+1)dx=2(-\frac{x^3}{3}+x)\Big|_0^1=2(1-\frac{1}{3})$.

[8] **2.** Find the area of bounded by the spiral $r=\theta$, the *x*-axis and the *y*-axis, for $0\le\theta\le\frac{\pi}{2}$.

Solution: Area = $\int_0^{\pi/2}\frac{1}{2}r(\theta)^2d\theta=\int_0^{\pi/2}\frac{1}{2}\theta^2d\theta=\frac{1}{2}\frac{\theta^3}{3}\Big|_0^{\pi/2}=\frac{1}{6}\left(\frac{\pi}{2}\right)^3$.

[9] **3.** Set up, but **do not** evaluate, the integral for the volume of the solid we get by rotating the region bounded by the curves $y=-x^2+2$ and $y=1$ around the *x*-axis.

Solution. *Volume* $=\int_{-1}^{1}[(-x^2+2)^2\pi-1^2\pi]dx$.