PRACTICE IV

1. Determine the area of the region bound by $y = x^2 + 2$, $y = \sin(x)$, $x = -1$, and $x = 2$.

2. Determine the area of the region bound by $y = x\sqrt{x^2+1}$, $y = e^{-\frac{1}{2}x}$, $x = -3$, and the y-axis.

3. Find the volume of the solid whose base is a disk of radius r and whose cross-sections are squares.

4. Determine f_{avg} for $f(x) = 8x - 3 + 5e^{2-x}$ on $[0, 2]$.

5. Evaluate

$$\lim_{x \to \infty} \arctan\left(\frac{3w^2 - 9w^4}{4w - w^3}\right)$$

6. Evaluate

$$\lim_{x \to -\infty} \ln\left(\frac{3z^4 - 8}{2 + z^2}\right)$$

7. Differentiate the following function

$$y = \frac{x^5}{(1-10x)\sqrt{x^2+2}}$$

8. Differentiate x^x