Exercise Set 6 (Total Points: 100)

Integrals (8 points each)

1. Find $\int_2^4 2x - 1 \, dx$

2. Find $\int \tan(x)\sec(x) + \frac{1}{x} dx$

3. Find $\int \sin(2x + 1) dx$

4. Find $\int_{\pi/6}^{\pi/4} \csc^2(x) dx$

5. Find $\int -xe^{-x} dx$

6. Find $\int \dfrac{2x \, dx}{x^2 + 1}$

7. Find $\int x^3 \ln(x) dx$

8. Find $\int x^2 \cos(x^3 + 1) dx$

9. Find $\int_0^1 \sin(\pi x) + \sqrt{1 - x^2} dx$

10. Find $\int e^{e^x + x} dx$

Areas and Volumes (10 points)

Problem (11). Find the area enclosed between the curves $y = x^2$ and $y = x + 2$

Problem (12). Find the volume of Gabriel's Horn: that is consider the curve $y = \frac{1}{x}$ and revolve it around the x-axis. Gabriel's Horn is solid starting at $x = 1$ and going to infinity. The name Gabriel's horn comes from a Christian tradition, as the horn the angel Gabriel uses to announce Doomsday.