

Math 21B - Homework Set 8

Section 8.1: Evaluate the following integrals.

1. $\int t^2 \cos t \, dt$

2. $\int_1^e x^3 \ln x \, dx$

3. $\int t^2 e^{4t} \, dt$

4. $\int e^\theta \sin \theta \, d\theta$

5. $\int_0^{\pi/3} x \tan^2 x \, dx$

6. $\int z(\ln z)^2 \, dz$

7. $\int \sin^{-1} x \, dx$

Section 8.4: Evaluate the following integrals.

1. $\int \frac{x+4}{x^2+5x-6} \, dx$

2. $\int \frac{x+3}{2x^3-8x} \, dx$

3. $\int_0^1 \frac{x^3}{x^2+2x+1} \, dx$

4. $\int_0^1 \frac{dx}{(x+1)(x^2+1)}$

5. $\int_1^{\sqrt{3}} \frac{3t^2+t+4}{t^3+t} \, dt$

6. $\int \frac{x^4}{x^2-1} \, dx$

Section 8.2: Evaluate the following integrals.

1. $\int_0^{\pi/2} \sin^5 x \, dx$

2. $\int_0^1 8 \cos^4(2\pi x) dx$
3. $\int_0^{2\pi} \sqrt{\frac{1 - \cos x}{2}} dx$
4. $\int_{-\pi/4}^{\pi/4} \sqrt{\sec^2 x - 1} dx$
5. $\int_0^{\pi/4} \sec^4 x dx$
6. $\int_{-\pi/4}^{\pi/4} 6 \tan^4 x dx$
7. $\int_{-\pi}^0 \sin(3x) \cos(2x) dx$

Section 8.3: Evaluate the following integrals.

1. $\int \frac{1}{\sqrt{9 + y^2}} dy$
2. $\int_0^2 \frac{dx}{8 + 2x^2}$
3. $\int_0^{3/2} \frac{dx}{\sqrt{9 - x^2}}$
4. $\int \frac{5}{\sqrt{25x^2 - 9}} dx \quad \text{for } x > \frac{3}{5}$
5. $\int \frac{1}{x^2 \sqrt{x^2 - 1}} dx \quad \text{for } x > 1$
6. $\int \frac{1}{x^2 \sqrt{x^2 + 1}} dx$
7. $\int_0^{\ln 4} \frac{e^t}{\sqrt{e^{2t} + 9}} dt$
8. $\int \frac{1}{x \sqrt{x^2 - 1}} dx$
9. $\int \frac{1}{\sqrt{1 - x^2}} dx$

Section 8.7: Evaluate the following integrals.

1. $\int_0^1 \frac{1}{\sqrt{x}} dx$

$$2. \int_0^1 \frac{1}{\sqrt{1-x^2}} dx$$

$$3. \int_1^\infty \frac{1}{x\sqrt{x^2-1}} dx$$

$$4. \int_0^\infty 2e^{-\theta} \sin \theta d\theta$$

$$5. \int_{-\infty}^\infty 2xe^{-x^2} dx$$

$$6. \int_0^1 x \ln x dx$$

$$7. \int_{-1}^4 \frac{1}{\sqrt{|x|}} dx$$

Section 11.2:

1. Find the surface area when the curve

$$\begin{aligned} x &= \cos t, \\ y &= 2 + \sin t, \quad 0 \leq t \leq 2\pi \end{aligned}$$

is revolved about the x -axis.

2. Find the surface area when the curve

$$\begin{aligned} x &= \ln(\sec t + \tan t) - \sin t, \\ y &= \cos t, \quad 0 \leq t \leq \frac{\pi}{3} \end{aligned}$$

is revolved about the x -axis.