Math 21B - Homework Set 8

Section 8.1: Evaluate the following integrals.

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

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

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

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

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

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

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

Section 8.4: Evaluate the following integrals.

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

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

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

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

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

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

Section 8.2: Evaluate the following integrals.

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

2. $\int_0^1 8\cos^4(2\pi x)\,dx$

3. $\int_0^{2\pi} \sqrt{\dfrac{1-\cos x}{2}}\,dx$

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. $\int \dfrac{1}{\sqrt{9+y^2}}\,dy$

2. $\int_0^2 \dfrac{dx}{8+2x^2}$

3. $\int_0^{3/2} \dfrac{dx}{\sqrt{9-x^2}}$

4. $\int \dfrac{5}{\sqrt{25x^2-9}}\,dx \quad \text{for } x > \frac{3}{5}$

5. $\int \dfrac{1}{x^2\sqrt{x^2-1}}\,dx \quad \text{for } x > 1$

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

7. $\int_0^{\ln 4} \dfrac{e^t}{\sqrt{e^{2t}+9}}\,dt$

8. $\int \dfrac{1}{x\sqrt{x^2-1}}\,dx$

9. $\int \dfrac{1}{\sqrt{1-x^2}}\,dx$

Section 8.7: Evaluate the following integrals.

1. $\int_0^1 \dfrac{1}{\sqrt{x}}\,dx$

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

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

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

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

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

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

Section 11.2:

1. Find the surface area when the curve

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

is revolved about the x-axis.

2. Find the surface area when the curve

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

is revolved about the x-axis.