1 Integration by Parts

Evaluate each of the following using integration by parts.

1. $\int x \csc^2 x dx$

2. $\int_0^{1/2} x \cos(\pi x) dx$

3. $\int t^2 \sin(2t) dt$

4. $\int_0^{\pi} \theta \sin\theta \cos\theta d\theta$

2 Trigonometric Substitutions

Evaluate each of the following using trigonometric substitutions.

1. $\int \sin^3\theta \cos^4\theta d\theta$

2. $\int_0^{\pi/2}(2-\sin\theta)^2 d\theta$

3. $\int \tan^3 t \sec t dt$

4. $\int(\tan^2 x + \tan^4 x)dx$

5. $\int \sqrt{1-\cos(4\theta)}d\theta$

6. Find the volume obtained by rotating the region bounded by the curves $y = \sin^2 x$ and $y = 0$, $0 \leq x \leq \pi$, about the x-axis.