

1 PART I: Trigonometric Integrals

Differentiate the following functions

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

2 PART II: Trigonometric substitutions

1. $\int \frac{x^2}{\sqrt{1-4x^2}} dx$
2. $\int \frac{3}{\sqrt{9+16x^2}} dx$
3. $\int \frac{\sqrt{9x^2-25}}{x} dx$
4. $\int \frac{8}{(36x^2+1)^{3/2}} dx$
5. $\int \frac{1}{x^2 \sqrt{4-x^2}} dx$
6. $\int \frac{6}{100x^2-64} dx$