Math 1552, Integral Calculus
Sections 8.3-8.4: Powers and Products of Trig Functions, Trig Substitution

Evaluate the following integrals using any method we have learned so far: integration by parts, integrating trig functions, or trigonometric substitutions. The problems below may require any combinations of the above methods, or even just u-substitutions, to obtain the final solution.

1. $\int \sin^5(2x)\cos^3(2x)dx$

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

3. $\int e^{2x}\sin(3x)dx$

4. $\int \frac{x^2}{(x^2+4)^{3/2}}dx$

5. $\int \frac{\sqrt{1-x^2}}{x^4}dx$

6. $\int \frac{x}{(4-x^2)^{3/2}}dx$

7. $\int \frac{dx}{e^x\sqrt{e^{2x}-9}}$

Answers

1. $\frac{1}{12}\sin^6(2x) - \frac{1}{16}\sin^8(2x) + C$

2. $\frac{1}{3}\tan^3(x) - \tan(x) + x + C$

3. $\frac{2}{13}e^{2x}\sin(3x) - \frac{3}{13}e^{2x}\cos(3x) + C$

4. $\ln|\frac{\sqrt{x^2+4}}{2} + \frac{x}{2}| - \frac{x}{\sqrt{x^2+4}} + C$

5. $-\frac{1}{3} \cdot \frac{(1-x^2)^{3/2}}{x^3} + C$

6. $\frac{1}{\sqrt{4-x^2}} + C$

7. $\frac{\sqrt{e^{2x}-9}}{9e^x} + C$