

**Math 1552, Integral Calculus**  
**Section 8.2-8.3: Integration by Parts and Trig integrals**

Evaluate the following integrals using any method we have learned so far: integration by parts, integrating trig functions, or u-substitution. 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.  $\int \sqrt{x} e^{\sqrt{x}} dx$

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

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

## 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.  $2(x - 2\sqrt{x} + 2)e^{\sqrt{x}} + C$

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

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