

## Math 1552, Integral Calculus

### Section 8.4: Trigonometric Substitutions

Evaluate the following integrals using any method we have learned so far:  $u$ -substitutions, integration by parts, integrating trig functions, or trigonometric substitutions.

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

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

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

4.  $\int \sin^2(x) \cos^2(x) dx$

5.  $\int (x^2 + 1)e^{2x} dx$

### Answers

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

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

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

4.  $\frac{x}{8} - \frac{1}{32} \sin(4x) + C$

5.  $\frac{1}{2}(x^2 + 1)e^{2x} - \frac{1}{2}xe^{2x} + \frac{1}{4}e^{2x} + C$