

M408S Homework 5. Due Monday, February 18

In these problems, we are going to compare trig substitutions to partial fractions in examples where you can use either.

- 1) Compute $\int \frac{2dx}{x^2-1}$ by partial fractions. Note that your answer works when $x^2 < 1$, and also works when $x^2 > 1$.
- 2) Now compute $\int \frac{2dx}{x^2-1} = \int \frac{-2dx}{1-x^2}$ with the trig substitution $x = \sin(\theta)$. Of course, this only works when $x^2 < 1$. How does your answer compare to what you got in problem 1?
- 3) Now compute $\int \frac{2dx}{x^2-1}$ with the trig substitution $x = \sec(\theta)$, which applies when $x^2 > 1$. Again, how does your answer compare to problems 1 and 2?
- 4) Now compute $\int \frac{dx}{(1-x^2)^2}$ by whichever method you prefer. If you use a trig substitution, you are likely to need $\int \sec^3(\theta)d\theta$, which is example 8 on page 475.

Book problems:

Section 7.3: Problems 4, 12 and 40.

Section 7.4: Problems 7, 9, and 54.