Math 1B Worksheet 2

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(Trigonometric Integrals, trigonometric substitution, partial fractions)

1. $$\int \frac{\sqrt{3+\tan x}}{\cos^2 x} dx$$

2. Use the Pythagorean Theorem and definition of $\sin x$ and $\cos x$ to show that

   $$\cos^2 x + \sin^2 x = 1$$

   and then use this identity to get

   $$1 + \tan^2 x = \sec^2 x$$

3. Let n be a positive integer. Find a general expression for

   $$\int \sin^n x \, dx$$

   for n is odd or even. [Hint: first try easy cases for n = 1, 2, 3, 4. Can you see a pattern?]

4. Let m, n be constants. Evaluate $\int \sin mx \ \cos nx \ dx$

5. Evaluate $\int \tan^2 x dx$ and $\int \tan^3 x dx$.

6. Evaluate $\int \sec^3 x dx$.

7. Evaluate $\int \frac{\sin^{-1}(2x)}{\sqrt{1-4x^2}} dx$

8. Evaluate $\int \frac{x^2}{\sqrt{1-x^2}} dx$ and $\int \frac{x^2}{\sqrt{1-x}} dx$

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

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

11. $\int \frac{dx}{x+x^3}$

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

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

14. $\int \frac{3e^{2x}}{e^{2x}-e^x-6} dx$

15. $\int \frac{dx}{x^2-6x+1}$