PRACTICE FOR MIDTERM 2

Problem 1. Compute the complex number $\frac{(\sqrt{3}+i)^3}{1+i}$. Express your answer in polar coordinates (r, θ) or as $re^{i\theta}$.

Problem 2. Find the antiderivative

$$\int \sin^7(x)\cos^3(x)dx.$$

Problem 3. Use trig substitution to find the antiderivative

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

Problem 4. Use partial fractions to calculate the antiderivative

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

Problem 5.(a) Does

$$\int_0^\infty \frac{1}{x^2+3x+2}dx$$

converge or diverge? Justify your answer.

(b) Evaluate the improper integral

$$\int_0^{\pi/2} \tan(x)dx.$$