Math 20B – Midterm 2 – 11/14/2018

Name & Student ID: _____

Question:	1	2	3	4	Total
Points:	10	10	10	10	40

Scratch paper.

1. (a) (5 points) Compute the complex number $\frac{(1+i)^4}{3i}$. Express your answer either in polar coordinates (r, θ) or as $re^{i\theta}$.

(b) (5 points) Find the antiderivative:

$$\int \cos^3(x)\sin^2(x)dx.$$

Show your work!

Extra paper for problem 1.

2. (10 points) Use trigonometric substitution to compute the antiderivative

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

Show your work!

Extra paper for problem 2.

3. (10 points) Use partial fractions to evaluate the integral:

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

Show your work!

Extra paper for problem 3.

4. (a) (5 points) Evaluate the improper integral

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

Show your work!

(b) (5 points) Determine whether or not the improper integral

$$\int_5^\infty \frac{1}{(x^2 + 1)\ln(x)}\,dx$$

converges or diverges. Justify your answer.

Extra paper for problem 4.