

Exam #2
Math 119
March 19, 2004

Name _____

All questions are worth an equal number of points. All work is to be done on the blank paper provided. At the end of the exam, please hand in this sheet, together with all of your work.

§1 Calculation

1. Evaluate each of the following. Show your work.

a. $(3 - 2i) + (1 + 5i)$

b. $(2 + i)(1 - 4i)$

c. $\frac{6 + 7i}{2 - i}$

d. $\frac{1}{1 - \sqrt{-9}}$

2. Solve $\sqrt{4x^2 + 8x + 7} - x = 1$.

3. Solve $4m^{-2} = 2 + m^{-4}$.

4. Solve $x^4 - 6x^3 + 14x^2 - 14x + 5 = 0$.

5. Let $f(x) = \frac{3x + 1}{x - 2}$. Find the intercepts, and the asymptotes. Sketch a graph; include a scale.

§2 Comprehension

6. Write a polynomial whose zeros are -1 , 1 , and 3 , where the zero -1 has multiplicity 3, the zero 1 has multiplicity 2, and the zero 3 has multiplicity 1.

7. Let $f(x) = \sqrt{9 - x^2}$ and $g(x) = \sqrt{4 - x}$. Find $(f \circ g)(x)$, $(g \circ f)(x)$ and their domains.

8. What is the inverse of a function? Explain how \sqrt{x} is defined as the inverse of a function.

§3 Application

9. A picture frame of uniform width has outer dimensions of 12 inches by 18 inches. How wide should the frame be to display an area of 140 square inches?

10. A college student takes out \$17,000 of student loans. If interest on the loan only starts to accumulate after graduation, how much will she owe five years after graduation, assuming a 7% interest rate with interest compounded monthly?