

Exam #3

Math 111-C

Friday, November 19, 1999

For full credit, show all of your work. When giving numerical answers, give at least three digits after the decimal point. Sketch any graph that you use.

Put all of your work on the blank paper provided. Staple your questions on top of your answers. You may answer the questions in any order.

1. Find the quotient and remainder for the following division:

$$\frac{2x^4 - 3x^3 + 4x^2 - 5}{x^2 + 3}$$

2. Find the vertex and axis for $y = 3x^2 + 6x + 7$.

3. Find the domain and range of the following function.

$$f(x) = \frac{x^3 + 1}{x^2 - 4}$$

4. Apply the Leading Coefficient Test to the following function, and explain the result in a sentence or two.

$$f(x) = -6x^7 + 8x^3 - 2x^2 + 5$$

5. Explain in a few sentences what the Fundamental Theorem of Algebra says.

6. Find the horizontal and vertical asymptotes for the following function:

$$f(x) = \frac{x^2 + 8x - 20}{2x^2 + 18x - 20}$$

7. Complete the square on $f(x) = x^2 + 5x + 7$.

8. Divide and express in standard form ($a + bi$ with a and b real):

$$\frac{2 - 7i}{3 + 5i}$$

9. Find the x - and y -intercepts of the following function:

$$f(x) = \frac{x^2 + 6x + 8}{x^2 - x - 6}$$

10. Find the roots of $f(x) = x^4 + 10x^2 + 24$.