Name:

Recitation Instructor:

Recitation Day & Time:

Total/100	Grade

MATH 100 College Algebra – **Exam III**

7:15–8:15pm, Tuesday April 11, 2006

Check that you have all three pages. SHOW ALL YOUR WORK. Write complex answers in $a + bi$ form.

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1. (16 points) Perform the indicated divisions:

(a) $(x^3 + 8x^2 + 5x - 3) \div (x - 1)$. Quotient=_____, Remainder=_____.

(b) $(3x^4 - 1) \div (x^2 + x + 4)$. Quotient=_____, Remainder=_____.

2. (7 points) $f(x) = 6x^4 - 19x^3 + 29x^2 - 15x - 9$.

(a) Use the rational zeros test to list all the *possible* rational zeros of the polynomial f.

(b) What are the *actual* rational zeros of f? You may use your calculator to futher reduce the possibilities you listed in (a).

3. (6 points) Find the zeros of the polynomial $p(x) = x^6 + 2x^5 - 8x^4$ and their multiplicities.

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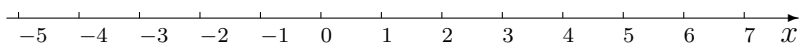
4. (7 points) Solve the polynomial inequality $6x^4 \leq 3x^3$. Give the solution set in interval notation. (If you use your calculator, explain what you are doing.)

5. (9 points) Solve the rational inequality $\dfrac{4}{x} < \dfrac{5}{x+1}$ and sketch the solution set on the real number line below. Remember to indicate the status of endpoints.



6. (10 points) (a) If $f(x) = x^2 - x + 2$ and $g(x) = x - 3$, then the composition $(f \circ g)(x) =$

(b) If $h(x) = 2x^3 - 7$, then the inverse function $h^{-1}(x) =$

7. (2 points) The graph of a polynomial f has 7 turning points. The smallest degree f can have is ____.

8. (5points) Express in terms of natural logarithms $\log_4 17 =$

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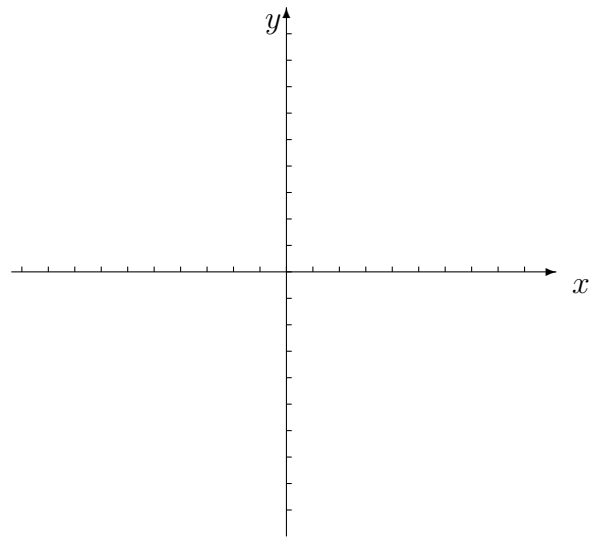
9. (18 points) Provide the following information and use it to graph the rational function

$$g(x) = \frac{x^2 - 9}{x^2 - 16}.$$



(a) The y-intercept:

(b) The x-intercept(s):

(c) Equations of any vertical asymptotes:

(d) Equation of any horizontal asymptote:

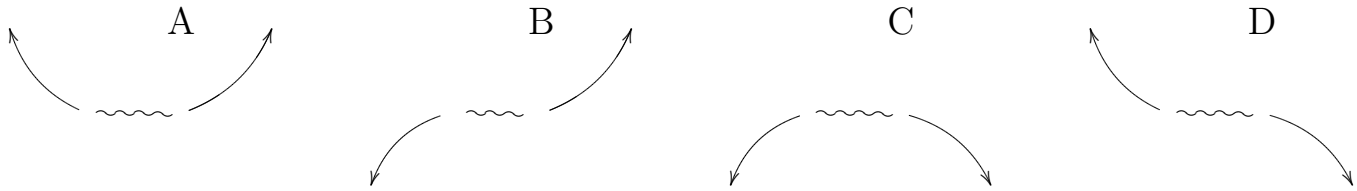
(e) Symmetry: Is $g(x)$ even, odd or neither?

10. (12 points) For the following rational functions find the vertical, horizontal and oblique asymptotes (write an **equation** for the asymptote in the space provided or N/A if there is not an asymptote of that type):

	vertical	horizontal	oblique
$f(x) = \dfrac{x+3}{2x^2+1}$			
$f(x) = \dfrac{x^2-7x}{x+4}$			

10. (4 points) The polynomial $x^4 - 6x^3 + 33x^2 - 102x - 26$ has zeros $1 - 5i$ and $2 + \sqrt{5}$. The other zeros are _____, _____. (Hint: No calculation is required.)

12. (4 points) Use the leading-term test to determine which graph best represents the behavior of the given polynomial as $x \to \infty$ and $x \to -\infty$:



(a) $-2x^6 + 5000x^4 + 3$. Circle One: A B C D.

(b) $-3000x^2 + x^3 + 700$. Circle One: A B C D.

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