Name:

Recitation Instructor:

Recitation Day & Time:

Total/100	Grade

MATH 100 College Algebra – **Exam III**

7:15–8:15pm, Tuesday November 1, 2005

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) $(x^3 + 3x^2 - 10x - 7) \div (x - 3)$. Quotient=_____, Remainder=_____.

(b) $(2x^4 - 9) \div (x^2 - x + 3)$. Quotient=_____, Remainder=_____.

2. (7 points) $f(x) = 10x^4 + 9x^3 + 6x^2 - 4x - 3$.

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

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

3. (7 points) Find the zeros of $p(x) = x^7 + 8x^6 + 16x^5$ and their multiplicities.

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4. (14 points) The polynomial $h(x) = x^3 + x^2 - x + 15$ has $h(-3) = 0$.

(a) A linear factor of $h(x)$ is _____.

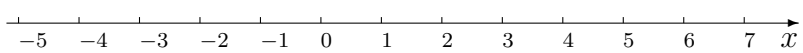
(b) Divide $h(x)$ by the factor in (a) to find the remaining quadratic factor.

(c) Find the zeros of $h(x)$.

(d) Factor $h(x)$ into three linear factors (using complex numbers if necessary).

5. (7 points) Solve the inequality $2x - 6 > 7(x - 1) + 3$. Give the solution set in interval notation.

6. (9 points) Solve the inequality $|3x - 5| > 4$ and sketch the solution set on the real number line below. Remember to indicate the status of endpoints.



7. (2 points) The graph of a polynomial f has 6 turning points. The smallest degree f can have is ____.

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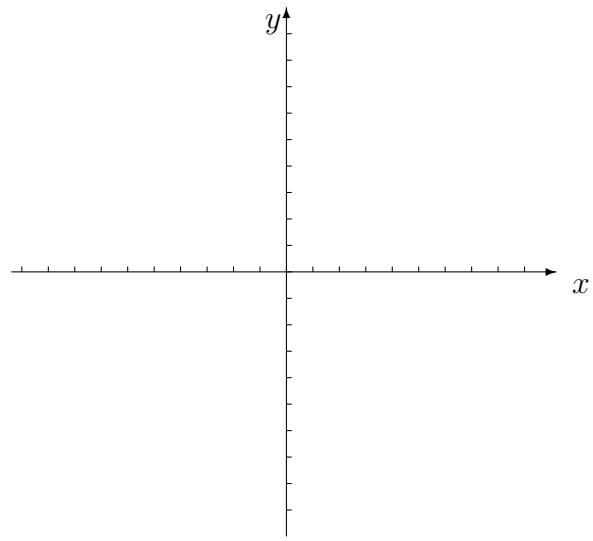
8. (18 points) Provide the following information and use it to graph

$$g(x) = \frac{2(25 - x^2)}{x^2 - 9}.$$



(a) The y-intercept:

(b) The x-intercept(s):

(c) Equations of any vertical asymptotes:

(d) Equation of any horizontal asymptote:

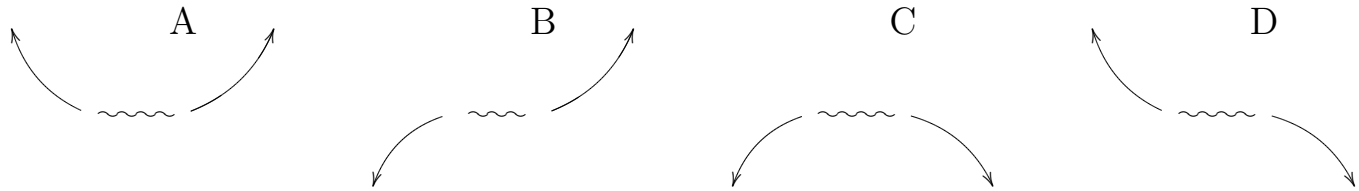
(e) Symmetry: Is $g(x)$ even, odd or neither?

9. (12 points) For the following 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
$f(x) = \dfrac{x+4}{x^2+16}$			
$f(x) = \dfrac{x^2-3x}{x+5}$			

10. (4 points) The polynomial $x^4 - 4x^3 + 5x^2 - 46x + 70$ has zeros $-1 + 3i$ and $3 + \sqrt{2}$. The other zeros are _____, _____.

11. (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) $-3x^4 + 3000x^3 + 7$. Circle One: A B C D.

(b) $-1000x^4 + 2x^5 + 500$. Circle One: A B C D.

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