Name:

Recitation Instructor:

Recitation Day & Time:

Total/100	Grade

MATH 100 College Algebra – Exam II

7:15–8:15pm, Tuesday March 7, 2006

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

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1. (8 points) Write the complex numbers in the standard form $a + bi$, where a, b are real numbers:

(a) $\sqrt{-25} + i^{17}$

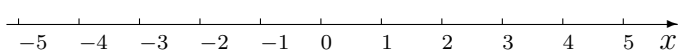
(b) $\dfrac{2+i}{4-i}$

2. (7 points) State the Quadratic Formula (for the solutions of the general quadratic $ax^2 + bx + c = 0$) and use it to solve the equation $2x^2 + 10 - 8x = 0$. Specify your values of a, b, c and simplify your answer.

3. (10 points) Find all x that satisfy the equation $\dfrac{x}{x+3} + \dfrac{6}{x^2-9} = \dfrac{2}{x-3}$.

4. (10 points) Find all the real numbers x which satisfy the equation $\sqrt{8+x} + x = 4$.

5. (6 points) Solve the inequality $|2x - 5| \geq 2$. Sketch the solution on the real number line below. Remember to indicate the status of endpoints.



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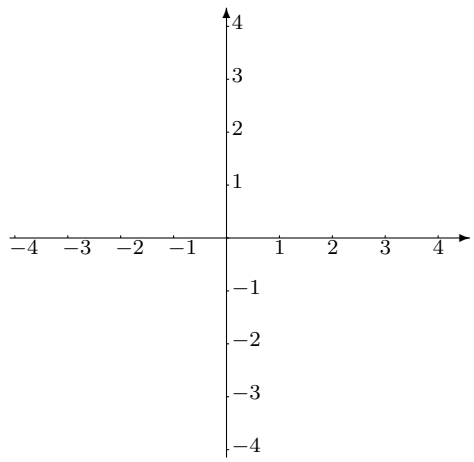
6. (6 points) Solve the inequality $5(x-1) \geq 3 - 7x$. Give your answer in interval notation.

7. (7 points) Sketch the graph of the piecewise-defined function

$$f(x) = \begin{cases} -x+3, & x \geq 0, \\ -3, & x < 0. \end{cases}$$



8. (8 points) For the graph of the quadratic

$$y = -3x^2 + 12x - 7$$

(a) Find the vertex. Is it a relative maximum or minimum?

(b) Find the x-intercepts if any (give exact values not a calculator approximation).

9. (6 points) (a) Test to see whether the function $f(x) = \dfrac{x^3}{2x^2+5}$ is even, odd or neither.

(b) Describe the symmetries of the graph of $y^3 = x$.

10. (6 points) Solve the linear equation for x. Give an exact answer, not a calculator approximation.

$$3(x+\sqrt{5}) - 8 = \sqrt{5}(x+4)$$

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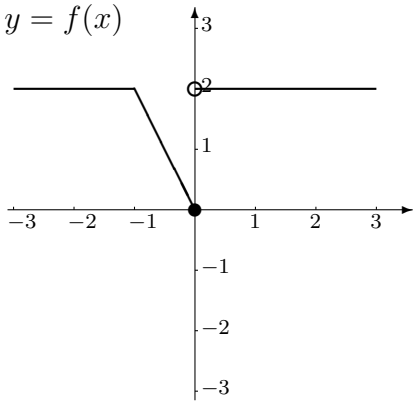
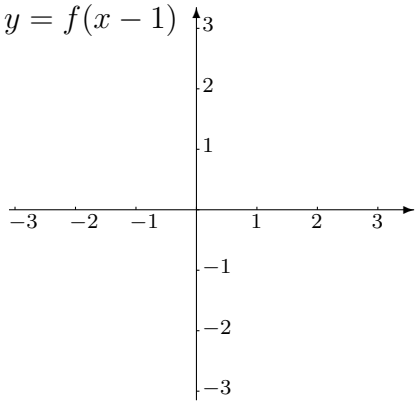
11. (9 points) The graph of $y = f(x)$ is shown on the first set of axes. Sketch the graphs requested on the other two. Underneath describe the transformations in words.

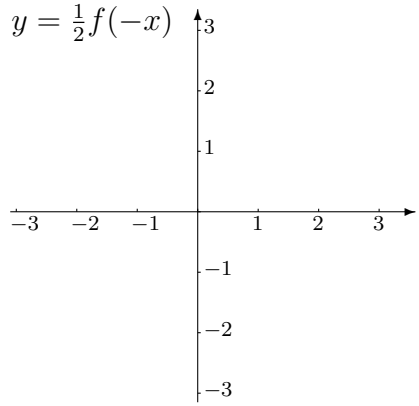
$y = f(x)$



$y = f(x-1)$



$y = \frac{1}{2}f(-x)$



12. (8 points)(a) Use your calculator to graph the function

$$f(x) = x^3 + x^2 - 9x + 7$$

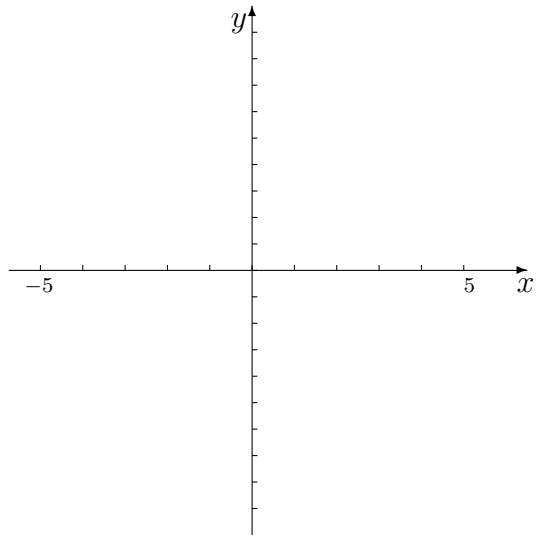
from $x = -5$ to $x = 5$ (use zoomfit for the y values and label your axes with the resulting y range).

(b) Give the coordinates (to 3 decimal places) of the points:

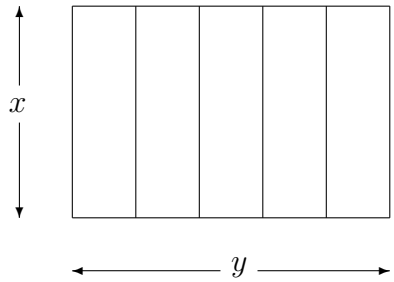
relative maximum =_____

relative minimum =_____

(c) Specify the interval(s) on which the function is increasing.



13. (9 points) A gardener has 2000 yards of fencing to enclose five adjacent plots as shown. Let x denote the width of the enclosure and y its total length.



(a) Write the length y in terms of x:

(b) Write the total area enclosed in terms of x:

(c) What choice of x maximizes this area? Justify your answer.

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