Name:

Recitation Instructor:

Recitation Day & Time:

Total/100	Grade

MATH 100 College Algebra – Exam II

7:15–8:15pm, Tuesday October 11, 2005

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

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

(a) $\sqrt{-16} + i^{11}$

(b) $\dfrac{1+i}{2-i}$

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 $x^2 + 29 - 10x = 0$. Specify your values of a, b, c and simplify your answer.

3. (10 points) Find all x that satisfy the equation $\dfrac{x}{x+2} + \dfrac{12}{x^2-4} = \dfrac{3}{x-2}$.

4. (10 points) Find all the real numbers x which satisfy the equation $\sqrt{x+8} - 6 = x$.

5. (6 points) (a) The slope m_1 of the line $3x + 2y = 7$ is $m_1 =$ _____.

(b) The slope m_2 of a line perpendicular to the line in (a) is $m_2 =$ _____.

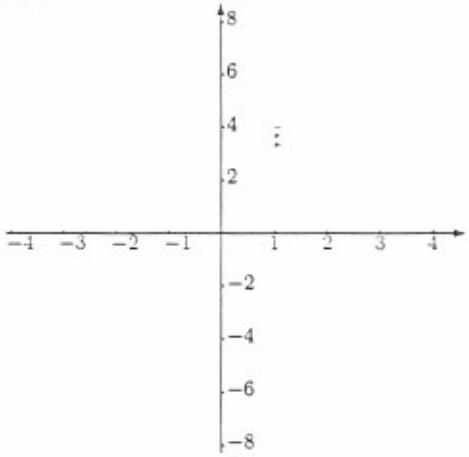
PG SCORE/41

6. (6 points) (a) The slope m of the line passing through $(1, -2)$ and $(-2, 7)$ is $m =$ _____.

(b) An equation for the line passing through the points in (a) is $y =$ _____.

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

$$f(x) = \begin{cases} 2, & x \geq 0, \\ 3x + 6, & x < 0. \end{cases}$$



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

$$y = 9x^2 - 6x - 1$$

(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 $f(x) = x^3 + \dfrac{1}{x^3}$ is even, odd or neither.

(b) Test whether the graph of $x^2 + y^2 = xy + 1$ is symmetric about the origin.

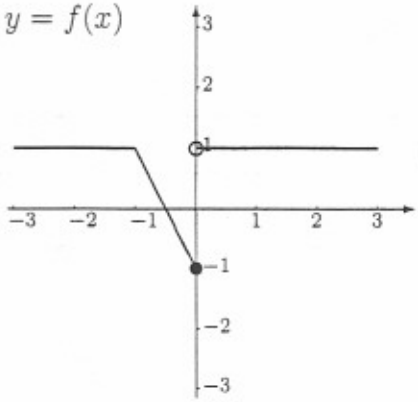
10. (6 points) Solve the linear equation for x. Give an exact answer, not a calculator approximation.

$$\sqrt{2}(x + 9) = 3(x + \sqrt{2}) - \sqrt{2}$$

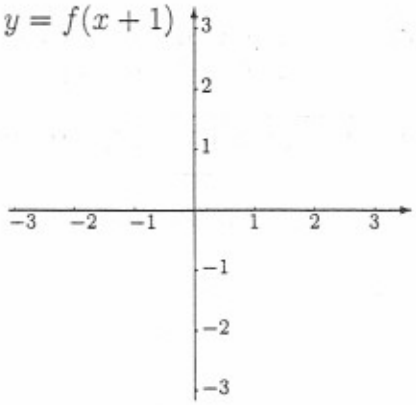
PC SCORE/33

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.

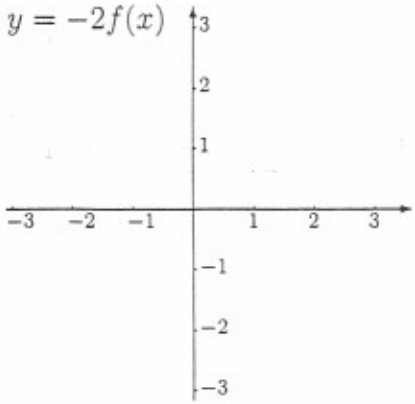
$y = f(x)$



$y = f(x+1)$



$y = -2f(x)$



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

$$f(x) = x^3 - x^2 - 12x + 15$$

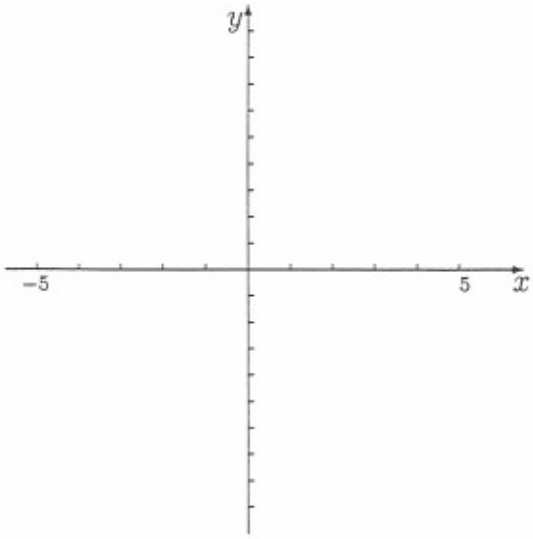
from $x = -5$ to $x = 5$ (use zoomfit for the y values and label your axes with the resulting y range).

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

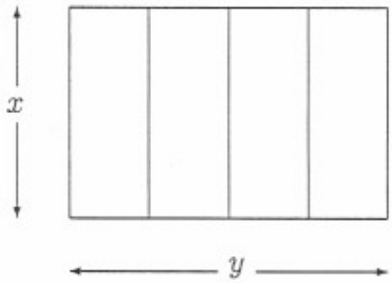
relative maximum =_____

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 four 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.

PG SCORE/26