

NAME:

Math 103 Exam 1 retake

12 December 2008

100 points

Instructions:

1. This exam has 6 pages (including this one), which contain 8 problems. Please check that you have all of the pages.
 2. Answer all of the following questions clearly and completely. Justify all of your answers.
 3. You may not use a book or any notes for this exam.
 4. Give your answer to each problem completely and clearly in the space provided. You may use the back of the exam pages for scratch work; however, if you want this work to be considered, make note of it in the space provided for the problem.
 5. Erase or cross out work you do not wish to be graded.
 6. Credit, partial or full, will be given only if sufficient steps leading to the answers are shown.
 7. You have 50 minutes to complete this exam.
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Problem 1. (8 points) Find the midpoint of the line segment joining the points $(2, -5)$ and $(12, 3)$.

Problem 2. (14 points) Solve the following inequalities.

(a) (7 points) $4 - 3(1 - x) \leq 3$

(b) (7 points) $|3t - 2| \leq 4$

Problem 3. (21 points) Solve the following equations.

(a) (7 points) $\frac{x+1}{3} + \frac{x+2}{7} = 2$

(b) (7 points) $x^2 - 4x - 1 = 0$

(c) (7 points) $x^4 - 10x^2 + 25 = 0$

Problem 4. (9 points) Find the center (h, k) and the radius r of the circle given by the equation

$$x^2 + y^2 - 10x + 2y - 10 = 0.$$

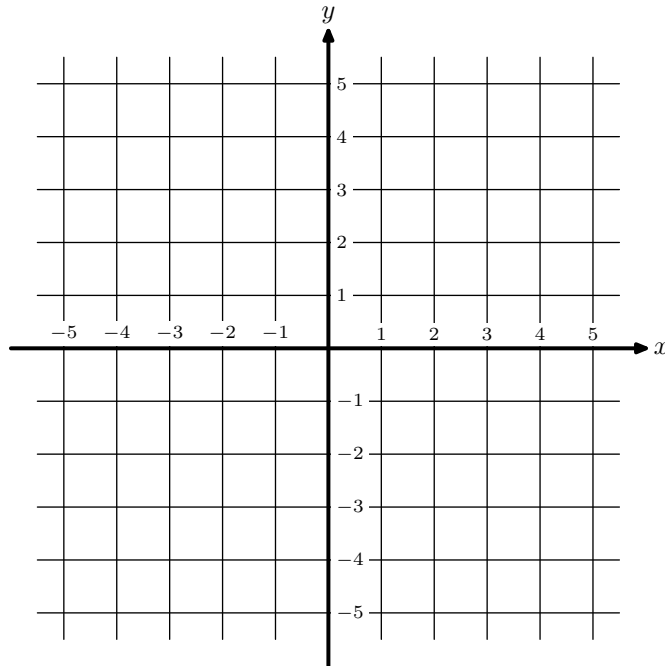
Problem 5. (10 points) Solve the following system of linear equations. The equations are numbered (1) and (2) for your convenience.

$$\begin{cases} 2x + 4y = -6 & (1) \\ x - 3y = 12 & (2) \end{cases}$$

Problem 6. (15 points)

(a) (7 points) Find all intercepts of the graph of the equation $2y = 8 - 4x$.

(b) (8 points) Use your answer from part (a) to graph the equation $2y = 8 - 4x$. Be sure to describe how you know what the shape of the graph is.



Problem 7. (8 points) What is a circle? Be as clear and precise as possible.

Problem 8. (15 points) An *altitude* of a triangle ABC is a line segment which has one endpoint at a vertex A of the triangle and the other endpoint on the side BC of the triangle opposite the vertex A , and which is perpendicular to the side BC .

Consider the triangle whose vertices are the points $(-2, 5)$, $(-1, 0)$, and $(5, 1)$. Find an equation for the line containing the altitude from the vertex $(-1, 0)$ to the opposite side.