

NAME:

MATH 103 Exam 1, version (b)

February 16, 2007

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 distance between the points $(1, -5)$ and $(6, 7)$.

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

(a) $8 - 2x < -2$

(b) $1 + |3x - 5| \geq 4$

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

(a) $9 - (4t - 1) = 18$

(b) $x^2 - 6x + 2 = 0$

(c) $x^3 + 2x^2 - 9x - 18 = 0$

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

$$x^2 + y^2 + 4x - 10y + 13 = 0.$$

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

$$\begin{cases} 4x + 3y = -5 & (1) \\ x - 2y = 18 & (2) \end{cases}$$

Problem 6. (15 points)

(a) (7 points) Find all intercepts of the graph of the equation $3y - 2x = 6$.

(b) (8 points) Use your answer from part (a) to graph the equation $3y - 2x = 6$. 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) The *perpendicular bisector* of a given line segment is the line which passes through the midpoint of the line segment and is perpendicular to the line segment.

(a) (5 points) Find the midpoint of the line segment from the point $(-1, 3)$ to the point $(3, 11)$.

(b) (10 points) Find an equation for the perpendicular bisector of the line segment in part (a).