

MAT 112 Final Exam Spring 2004

May 3, 2004

Do not open this booklet until you are told to do so. Show all work required to solve the problems. Incorrect answers not supported by work will receive **no** partial credit. You may use a calculator on any part of the exam, but you may not share a calculator with another student. If you have any questions, ask one of the proctors.

Name: _____

Signature: _____

Instructor's Name (circle one): Hajduk

Page:	Points:
1	
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3	
4	
5	
6	
7	
TOTAL	

1. Simplify the following expressions.

a. (3 points) $5(45 - (-2 \cdot 3) + 4^2)$

b. (3 points) $-5^2 + 8 \div 4 \div 2 + 1$

c. (3 points) $\sqrt[3]{\frac{343}{125}}$

d. (3 points) $\frac{(xy)^5}{(x^3y^{-2})}$

2. Give an example to illustrate each of the following properties.

a. (2 points) Commutative Property for addition

b. (2 points) Associative Property for multiplication

c. (2 points) Distributive Property for multiplication over addition

3. The point $(1, -2)$ lies on a line with slope, m , equal to 5.
- (3 points) Find the equation of this line.
 - (3 points) Find the x and y intercepts of this line.
 - (2 points) Find an equation for a line that is parallel to this line.
 - (2 points) Find an equation for a line that is perpendicular to this line.
4. True or False? Write T or F, making sure it is legible. If false, provide an example to illustrate this.
- (2 points) If you add two linear functions, you obtain a non-linear function.

 - (2 points) The product of two linear functions is not linear. _____
 - (2 points) If you multiply a linear function by a constant, it is not linear.

 - (2 points) If you add a constant to a linear function, you obtain a linear function. _____

5. Solve the following equations algebraically.

a. (3 points) $5|3x - 4| = 25$

b. (3 points) $3|x - 7| = 39$

c. (3 points) $\sqrt{x^2 - 13} = 7$

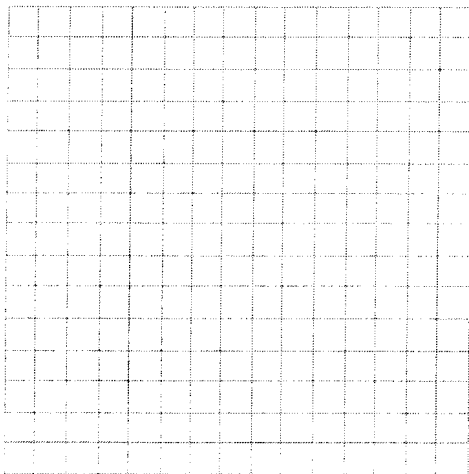
d. (3 points) $x\sqrt{5} = \sqrt{50x - 125}$

6. Consider the function $f(x) = 2x^2 + 4x + 1$.

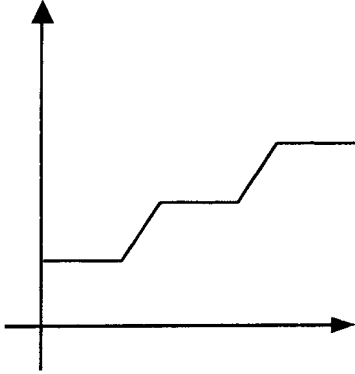
a. (3 points) Express $f(x)$ in the form $y = a(x - h)^2 + k$ by completing the square.

b. (2 points) Provide the coordinates of the maximum and minimum for $f(x)$.

7. Consider the equation $y = -3|x - 2| + 5$.
- a. (3 points) Identify a , h , and k and determine the vertex of the graph of this equation.
 - b. (2 points) What does the value of a tell you about how the graph opens?
 - c. (2 points) The value of k in this instance shifts the graph in which direction? How many units is the graph translated?
 - d. (2 points) The value of h in this instance shifts the graph in which direction?
 - e. (3 points) Graph the equation accurately using at least 3 points.



8. (5 points) The following graph was obtained using a CBR system (distance vs. time). Describe as fully as possible how the individual walked to create this graph. You may want to add scales on the x- and y-axes.



9. Suppose a cannon is fired from the top of a 10-meter hill at a velocity of 25 meters per second and its height, h , in meters, is given by the equation $h = -4.9t^2 + 34.3t + 10$, where t represents time in seconds.
- (3 points) At what time is the cannon ball at its maximum height? Solve this algebraically.
 - (2 points) What is the maximum height?
 - (3 points) If the cannon's target is at sea level, how long will it take the cannon ball to hit the target?

10. Consider the functions $f(x) = 4x + 3$ and $g(x) = 10x - 15$.

- a. (2 points) What types of functions are these?

- b. (3 points) For what value(s) of x is $f(x) = g(x)$?

- c. (3 points) For what value(s) of x is $f(x) < g(x)$?

- d. (3 points) For what value(s) of x is $f(x) > g(x)$?

11. (4 points) Solve the following inequality: $4(x + 3)(-1) \geq 7x - 8 + 2x - 1$.

12. There is a basketball game at Syracuse University. If you buy tickets at least 24 hours before the game, the cost of each ticket is \$15. However, if you buy tickets at the game, the costs are \$20 for students and \$25 for non-students. 325 people buy their tickets ahead of time. A total of 755 people attend the game and the total proceeds of all ticket sales are \$14,625. How many students and how many non-students bought their tickets right before the game at the ticket booth?
- a. (2 points) Identify the variables in this situation and note what each variable represents.
- b. (2 points) Using the problem situation described above, identify the relations among the variables. Write these relations using the variables you defined in part a. Set up the linear system, but do not solve yet!
- c. (3 points) Solve the system of linear equations. That is, solve for your variables defined in part a.