

Math 99
Exam 3
December 1, 2006

Name: _____

1. Your exam contains 5 questions and 5 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values for problems vary and these are clearly indicated. You have 50 minutes for this exam.
3. Make sure to **ALWAYS SHOW YOUR WORK**; you will not receive any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. If you need extra space, use the back page of the exam and clearly indicate this.
5. You are allowed one 8.5×11 sheet of handwritten notes (both sides). Graphing and scientific calculators are allowed.
6. Leave answers in exact form (as simplified as possible).

Problem	Total Points	Score
1	20	
2	25	
3	20	
4	15	
5	20	
Total	100	

1. (20 pts.) Simplify the following. Recall that $i^2 = -1$.

(a) (5 pts.) i^{143}

(b) (5 pts.) $(2 + 3i)(-1 - 5i)$

(c) (5 pts.) $(2 + 3i) + (-1 - 5i)$

(d) (5 pts.) $\frac{4}{1+i}$

2. (25 pts.) For the following problems, **simplify** your answers as much as possible.

(a) (8 pts.) Solve for x : $-2(x - 3)^2 = 8$

(b) (9 pts.) Complete the square to solve for r : $3r^2 + 15r + 9 = 0$

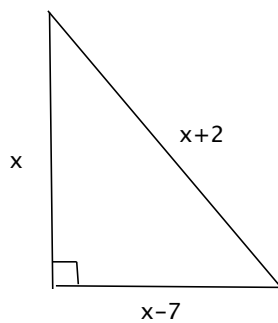
(c) (8 pts.) Use the quadratic formula to solve for t : $-2t^2 + 6t = 1$

3. (20 pts.) Being a natural-born rebel, you decide to toss a coin from the top of a building 48 feet high. Since you are a rebel who knows physics, you find that the height (in feet) of the coin above the ground at a given time t (in seconds) is modeled by the function $s(t) = -16t^2 + 8t + 48$.

(a) (10 pts.) How high above the ground is the coin after 1 second?

(b) (10 pts.) At what time(s) is the coin 48 feet above the ground?

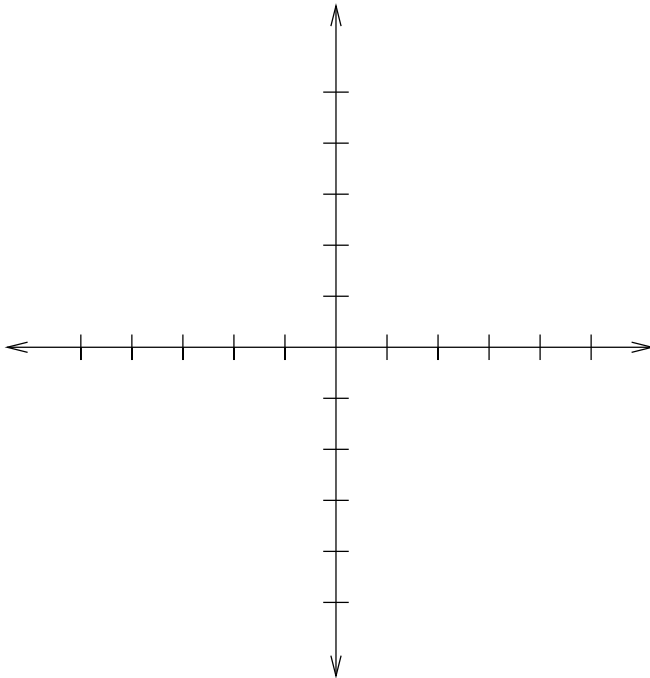
4. (15 pts.) Find the lengths of the sides of the following right triangle.



5. (20 pts) $f(x) = -\frac{1}{2}(x + 1)^2 + 3$

(a) (5 pts.) What is the vertex of f ?

(b) (10 pts.) Sketch a graph of f below. Include 2 points on the graph other than the vertex.



(c) (5 pts.) What is the range of f ?