

Math 121	Exam 2	Dias	Spring 2008
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Name: \_\_\_\_\_ ID#: \_\_\_\_\_

Signature: \_\_\_\_\_

Your TA Name: \_\_\_\_\_

Correct Discussion Time: \_\_\_\_\_

**Directions:**

1. Read all instructions carefully.
2. Answer all seven questions.
3. Show all your work neatly.
4. Approximations will not be accepted where *exact* values are required.
5. Example: **1.41421...** will not be accepted in place of the *exact* value  $\sqrt{2}$ .
6. Cell phones or any other communications devices must be turned off during the exam.
7. Any act of dishonesty in the examination is a cause for dismissal from the University.
8. Make sure you read #1 above.

**For graders use only**

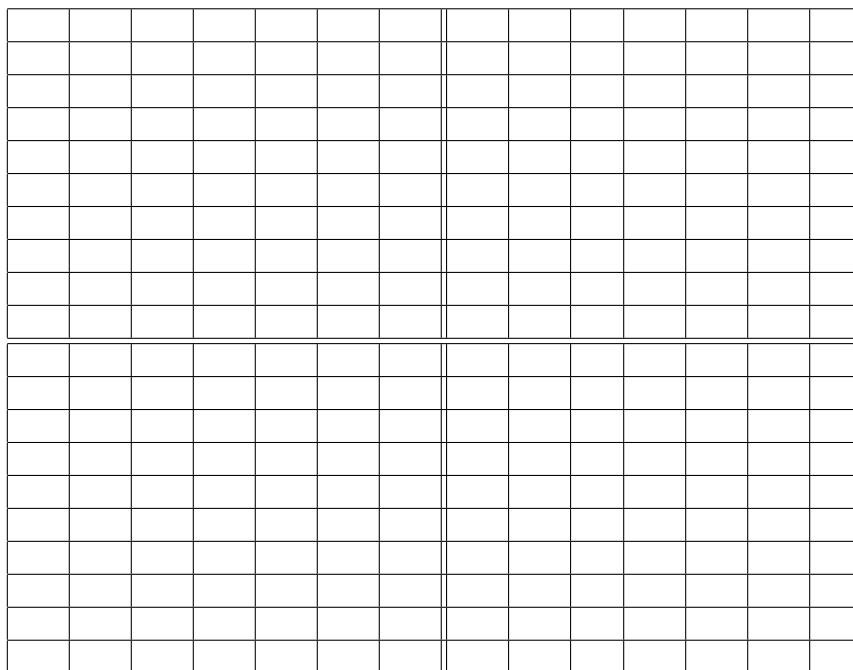
#	points	score
1	15	
2	15	
3	15	
4	15	
5	15	
6	15	
7	15	
Total	105	
E.C.	05	

1. The ABC Company has determined that profit on its Luxury ensemble is given by  $p(x) = -4x^2 + 1600x - 4000$  where  $x$  is the number of units sold.
  - (a) What is the profit on 100 units?
  - (b) How many units should be sold to maximize profit? What is the maximum profit?

2. The polynomial function,  $P(x)$  of degree **4** has the following roots:  
 $-3$  and  $-1$  of *multiplicity* one and,  $1$  of *multiplicity* two.

If  $P(0) = 6$ :

- (a) find the equation of  $P(x)$ ,
- (b) Draw a sketch of  $P(x)$ , label neatly the x-intercepts and the y-intercept.
- (c) **Extra Credit** (5) *Points*  
If  $G(x) = P(x - 3)$ 
  - i. what are the roots of  $G(x)$ ?
  - ii. what is the value of  $G(3)$ ?



3. (a) Simplify:  $(x - 3i)(x + 3i) =$  \_\_\_\_\_  
(b) Given  $3i$  is a root of  $f(x) = x^4 - x^3 + 7x^2 - 9x - 18$ , find all roots of  $f(x)$ .

4. Given  $f(x) = \frac{(x+2)(2x-4)}{(x-3)(x+2)}$ , find the following:

- (a) The domain of  $f(x)$ ? \_\_\_\_\_  
(b) The equations of the vertical asymptotes, if any? \_\_\_\_\_  
(c) The x coordinates of the holes, if any? \_\_\_\_\_  
(d) The equations of horizontal asymptotes, if any? \_\_\_\_\_  
(e) The x intercepts, if any? \_\_\_\_\_  
(f) The y intercepts, if any? \_\_\_\_\_

5. Solve the inequality and give the answer in interval notation.

(a)  $|3x - 2| \geq 7$

(b)  $\frac{x-2}{x+3} \leq -4$

6. (a) Simplify using rational exponents.  $\sqrt{x}\sqrt[3]{x^4}\sqrt[6]{x}$

(b) Write  $\ln(x^5y^3)$  in terms of  $c$  and  $d$  where  $c = \ln x$  and  $d = \ln y$

(c) Solve for  $x$ : Give the exact answer.  $\ln(3x - 5) = \ln 6 - \ln 2$

7. How long will it take to double your money if you invest **\$5000** at a rate of **5%** per year
- (a) if compounded annually?
  - (b) if compounded continuously?

(Give your answers accurately to 3 places of decimals)