Appendix A4.4.7

Mathematics

FLORIDA A&M UNIVERSITY
COLLEGE of ARTS and SCIENCES
Questions from Governor Rick Scott
Response Document for Academic Deans

Name of DEPARTMENT: Mathematics

Note: The listing of questions A through Q has gaps in the lettering because they correspond to the Governor's request, and the deans are not being asked to respond to every question. Please use the lettering as they appear below for each of your responses.

	QUESTION	RESPONSE
A.	*What studies has your university done in the last three years to ensure your graduates are meeting the needs of employers?*	
B.	*Do you have measurable goals to meet employers' current needs? If so, please provide them. How often are these goals updated?*	
C.	*Do you have measurable goals for each graduate in the areas of writing proficiency and critical thinking? If so, please send them to me with the goals and include the results for the last five to ten years.*	The Department has a communication student learning outcome for all mathematics courses and one for mathematics majors. The slo states: (1) Demonstrate proficiency in written and oral communications involving mathematical concepts to technical and non-technical audiences and (2) Demonstrate proficiency in research using techniques of mathematical modeling or pure mathematics as measured by the ability to create a technical/research report
E.	*Are professors required to integrate writing proficiency and critical thinking into all courses? If so, what oversight is provided to ensure that these skills are being taught? How are these skills integrated into course assessments?*	Mathematics faculty incorporate writing proficiency in math courses through projects (samples included). Calculus examples and an example from MGF 1106 Liberal Arts Math I. Rubrics are used to assess students (examples are attached).;

	QUESTION	RESPONSE
F.	*Do you have measurable goals for student success after graduation? If so, please send me the goals and the*	
M.	*M. What programs do you have to educate students regarding job opportunities? What are your measureable goals for each program? Do you use information similar to the data available from the Florida education and Training Placement Information Program (FETPIP) to prepare students prior to admission and prior to selection of major? Please provide me the results for the last five to ten years .*	
Q.	*Q. Please provide me with any additional information you think way be helpful, including your thought process to make sure we are headed in the right direction .*	

Due: _____ by 5:00pm in the CourseCompass Digital Dropbox (project and individual grades)

(no excuses including "the server was down" / no hard copies) ***Note:*** Click "Send File" not "Add File"

Make sure you have the following Name exactly (if not, the **GROUP loses 10 pts**):

Name: ***Group members first and last names,*** **Project 1**

Directions: Work in **groups** of **three (3) or four (4)**. **No collaborating** between groups. If I feel that groups have collaborated, then your group and the collaborating group(s) will receive a grade of **zero** (0) for Project 1. All technical reports must be written in MSWord. The individual grades can be written in the "Comments" section of the Digital Dropbox. Make sure to write all group members' first and last names (**including yourself**) and then rate all group members (**including yourself**) on a scale from 0 - 15. This will make up 15 points of the 100 point grade. The **Name** for the Digital Dropbox MUST say **"individual grade"** exactly. This is all that can appear. Group members' names can not appear in the Name of the Digital Dropbox. Therefore, each group will submit 3 items for the Digital Dropbox: (1) one from the person who is submitting Project 1 on behalf of the group (this person can include their individual grades in Comments section of the Digital Dropbox), (2) one from the second member of the group that has only the individual grades which will be written in the Comments section of the Digital Dropbox, and (3) one from the third group member that has only the individual grades which will be written in the Comments section of the Digital Dropbox. Remember, click "Send File" not "Add File".

NOTES: (1) If groups having more than four members or less than three members submit projects, that group will lose 70 points before the project is graded. I will not help with creating a group after ***your class*** two weeks before the project is due . I also will not consider giving special permission for other group sizes after ***your class*** two weeks before the project is due .

(2) Fifteen (15) points will be based on your grade from your group members. If you do not submit a rating for the other 2 group members **AND** yourself, you will lose 15 points on the project.

(3) A **complete project** consists of::

(a) **technical report** (TYPED in MSWord) that includes:

(*i*) all formulas used and why those formulas were used,

(*ii*) a clear explanation of all steps,

(*iii*) all graphs,

(*iv*) explanation of manipulations used to solve given problems.

Since this is a technical report, write it accordingly. That means use **paragraphs, proper punctuation, complete sentences,** along with being **consistent and coherent!!!** And do not forget to do a **spell check.**

(b) If my name and/or the names of the group members are not spelled correctly, you will receive a **10 point deduction** (for each misspelled name) from the project grade (no excuses).

Problems for Project 1

(1) A firm can produce x computers for an average cost per computer of $A(x)$ dollars, where $A(x) = \frac{2500x^2+100x}{2x^3}$. Assume that it is possible for the firm to increase production without bound. What value would the average cost per computer approach?

(2) The population for a rural region is increasing due to the construction of a new industrial plant. The population is given by $P(t) = 100\sqrt{t} + 280$ where t is measured in months with $t = 0$ corresponding

to March 1991.
(a) What was the initial population?
(b) What is the population after 2 months?
(c) Calculate the limit of the population as the end of 1991 approached.

(3) A company manufactures and sells x air conditioners per month. The monthly cost and price-demand equations are

$$C(x) = 180x + 20,000$$
$$p = 220 - 0.001x \qquad 0 \leq x \leq 100,000$$

(a) How many air conditioners should the company manufacture each month to maximize its monthly profit? What is the maximum monthly profit, and what should the company charge for each air conditioner to realize the maximum monthly profit?
(b) Repeat part (a) if the government decides to tax the company at the rate of $18 per air conditioner produced. How much revenue will the government receive from the tax on these air conditioners?
(c) Repeat part (a) if the government raises the tax to $23 per air conditioner. Discuss the effect of this tax increase on the government's tax revenue.

INSTRUCTIONS

Use your calculator to assist with the completion of this project. You must include a typed report explaining each step and your reasoning as you solve this problem. Please do not describe techniques but explain WHY they are being used. For example, do not say "we then take the derivative to find critical numbers" but instead one might say "we now find the critical numbers because these are the values at which relative maxima and minima may occur." **You must work in groups no fewer than three and no larger than four. I will not accept a project from a group of any other size. You are not allowed to collaborate across groups. Any groups suspected of collaborating will automatically receive a "0" for the project.**

Problem Description

Assume that the operating cost of a certain truck (excluding driver's wages) is

$$12 + \frac{x}{6} \text{ cents per mile}$$

when the truck travels at $x\,mph$. If the driver earns \$6 per hour, what is the most economical speed to operate the truck on a 400 mile turnpike where the minimum speed is $40\,mph$ and the maximum speed is $70\,mph$?

Assignment

Complete the above problem. A completed project should include the following:

1. A title at the top of the page and the first AND last names of all of the group members.
2. A problem description. This is a short paragraph describing the problem as you see it, including clarification of the given entities and statements of all equations including the equation to be maximized or minimized. Along with this, any graphs or diagrams needed to solve the problem should be included.
3. All steps for solving the problem with their explanations. One should avoid statements such as "next we take the derivative" but should instead include statements such as " we are taking the derivative to find critical numbers as these are the values at which relative extrema occur."
4. A conclusion detailing exactly what was to be found in the problem and your results as you see them from your analysis.

All projects are due **November 5, 2004 at the beginning of class**. These projects should be submitted via the "Digital Drop Box" in Blackboard. The subject line must read **"project 1"** and must include the **first AND last names of all** group members. As a reminder, do not forget that when using the Digital Drop Box, you must not only add the file to be sent but must also send it. Please note that projects that are not submitted correctly will be considered late and will not be accepted resulting in a "0" for all group members. Again, no projects will be accepted that are submitted after the start of your class. To avoid unnecessary problems, **START EARLY!!!!**

MAC 2311 PROJECT 2 SUMMER 2009

Due: Sunday, August 2, 2009 by 3:00pm in the CourseCompass Digital Dropbox (project and individual grades)
(no excuses including "the server was down" / no hard copies) ***Note:*** Click "Send File" not "Add File"
Make sure you have the following Name exactly (if not, the **GROUP loses 10 pts**):
Name: *Group members first and last names*, Project 2

Directions: Work in **groups** of **three (3)** to **five (5)**. **No collaborating** between groups. If I feel that groups have collaborated, then your group and the collaborating group(s) will receive a grade of **zero** (0) for Project 2. **All technical reports must be written in MSWord**. The individual grades can be written in the "Comments" section of the Digital Dropbox. Make sure to write all group members' first and last names (**including yourself**) and then rate all group members (**including yourself**) on a scale from 0 - 15. This will make up 15 points of the 100 point grade. The **Name** for the Digital Dropbox MUST say **"individual grade"**. This is all that can appear. Group members' names can not appear in the Name of the Digital Dropbox. Therefore, each group will submit 3 to 5 items for the Digital Dropbox: (1) one from the person who is submitting Project 2 on behalf of the group (this person can include their individual grades in Comments section of the Digital Dropbox) with the name ***Group members first and last names*, Project 2**, (2) one from the second member of the group that has only the individual grades which will be written in the Comments section of the Digital Dropbox with the name **"individual grade"**, (3) one from the third group member that has only the individual grades which will be written in the Comments section of the Digital Dropbox with the name **"individual grade"**, (4) one from the fourth group member that has only the individual grades which will be written in the Comments section of the Digital Dropbox with the name **"individual grade"** and (5) one from the fifth group member that has only the individual grades which will be written in the Comments section of the Digital Dropbox with the name **"individual grade"**. Remember, click "Send File" not "Add File". You must attach a file.

NOTES: (1) If groups having more than five (5) members or less than three (3) members submit projects, that group will lose 70 points before the project is graded. I will not help create groups after ***your class*** on ***Thursday, July 16, 2009*** . I also will not consider giving special permission for other group sizes after ***your class*** on ***Thursday, July 16, 2009*** . In other words, you need to ask me about groups at the beginning of class on ***Thursday, July 16, 2009***. After class, there is nothing that I can do.

(2) Fifteen (15) points will be based on your grade from your group members. If you do not submit a rating for the other 2 to 4 group members **AND** yourself, you will lose 15 points on the project.

(3) A **complete project** consists of::

(a) **technical report** (TYPED in MSWord) that includes:

(*i*) all formulas used and why those formulas were used,
(*ii*) a clear explanation of all steps,
(*iii*) all graphs,
(*iv*) explanation of manipulations used to solve given problems.
Since this is a technical report, write it accordingly. That means use **paragraphs, proper punctuation, complete sentences,** along with being **consistent and coherent!!!** And do not forget to do a **spell check.**

(b) If my name and/or the names of the group members are not spelled correctly, you will receive a **10 point deduction** (for each misspelled name) from the project grade (no excuses).

Problems for Project 2

(1) When you cough, you are using a high-speed stream of air to clear your trachea (windpipe). During a cough your trachea contracts, forcing the air to move faster, but also increasing the friction. If a trachea contracts

from a normal radius of 3 centimeters to a radius of r centimeters, the volocity of the airstream is $V(r) = c(3 - r)r^2$, where c is a positive constant depending on the length and the elasticity of the trachea. Find the radius r that maximizes this velocity.

(2) A television manufacturer produces a certain model of 14-inch color television for \$126 each, with fixed costs of \$2000. The price function is defined by $p(x) = 224 - x$, where $p(x)$ is the price, in dollars, when exactly x televisions are sold. Determine how many televisions should be produced and the price to e charged for each television in order to maximize profit.

(3) A model for the food-price index (the price of a representative "basket" of foods) between 1984 and 1994 is given by

$$I(t) = 0.00009045t^5 + 0.001438t^4 + 0.06561t^3 + 0.4598t^2 - 0.6270t + 99.33$$

where t is measured in years since midyear 1984, so $0 \leq t \leq 10$, and $I(t)$ is measured in 1987 dollars and scaled such that $I(3) = 100$. Estimate the times when food was cheapest and most expensive during the period 1984 - 1994.

Mathematics Rubric

Limit Quiz (2.2, 2.4, 2.5)

Name: _____ **Date:** 9/16/2011

Goals/Outcomes	Advanced/Superior (3 pts)	Proficient/Satisfactory with Minor Flaws (2 pts)	Progressing/Nearly Satisfactory with Serious Flaws (1 pt)	Does Not Meet Expectation (0 pts)
Mathematical Language	Student uses proper mathematical language, symbols, and notation correctly, throughout the assignment/problem.	Student uses proper mathematical language, symbols, and/or notation with few flaws throughout the assignment/problem.	Student does not use proper mathematical language, symbols, and/or notation throughout the assignment/problem.	Student does not use mathematical language.
Solution	Student answers all questions correctly.	Student answers a majority of the questions correctly.	Student answers half or less of the questions correctly.	Student does not answer any questions correctly.
Readability/ Organization	Student organizes thoughts in an easy to read fashion writing clearly, orderly, and logically throughout the assignment/problem.	Student organizes thoughts in a readable fashion showing thought process throughout the assignment/problem.	Student thoughts are incomplete and/or unclear throughout the assignment/problem.	Student does not respond to any problems.
Algebraic Manipulation	Student uses algebraic properties correctly throughout the assignment/problem.	Student uses algebraic properties correctly throughout most of the assignment/problem.	Student uses algebra properties incorrectly throughout most of the assignment/problem.	Student does not use algebraic properties correctly.
Trigonometry Knowledge	Student uses trigonometric properties correctly throughout the assignment/problem.	Student uses trigonometric properties correctly throughout most of the assignment/problem.	Student uses trigonometric properties incorrectly throughout most of the assignment/problem.	Student does not use trigonometric properties correctly.

Sample Critical Thinking and Writing Assignment for MGF 1106

(25 points)

Submit a one-two page paper on the following topic:

"Alternatives the Federal Government could have pursued instead of giving 2.5 trillion in tax cuts for 10 years."

GUIDELINES:

(1) Papers must have accurate monetary information and calculations must be shown to substantiate statements made by ThinkProgress on how the 2.5 trillion loss in revenue (due to Bush tax cuts) could be spent.

(2) Accuracy and reliability of information must be demonstrated by references to "reliable" sources, for example, websites of government (or legitimate private) agencies or articles published in scholarly journals. References must be cited in the Appendix of your report.

EXAMPLES OF TYPES OF ANALYSES:

(1) Some websites (www.nationalpriorities.org) state that over 19 million students could have paid their entire tuition, room, and board, for four (4) years at a public university.

Your paper should show how these calculations are determined and the nature of data used. You should reference data for tuition, room and board at four (4) major public universities in the South, Northeast, Midwest, and West to analyze college costs in each region.

(2) A New York Times article by David Leonhart (1-17-2007) states that 1.2 trillion could "pay for every American whose diabetes or heart disease is now going unmanaged and a global immunization campaign to save millions of children's lives."

Your paper could show how data and calculations are used to justify or analyze any one of the following:

(i) How much does it cost to treat the average patient with heart disease and how many Americans (probably without health insurance) do not receive the necessary treatment, and thus how many could receive treatment for 1.2 trillion.

(ii) What immunizations could be given worldwide to meet serious health needs and how much do these cost per person and how many could be given for 1.2 trillion.

(3) A recent publication stated that the tax cuts previously enacted allowed 5% of the "wealthiest in America" to actually receive 92 billion in tax savings in 2008.

Your paper should analyze how this statement is justified and how calculations are made.

(4) Analyze the statement: "3.67 million elementary school teachers could be hired every year for ten (10) years using 2.5 trillion dollars."

Use data for the average beginning salary of an elementary school teacher (grades 1-5) in four (4) different states in the U. S. A.—preferably one state in the West, Midwest, Northeast, and South (Florida or Georgia) regions.

(5) Analyze the statement: "Retrofit 54.2 million households for solar photovoltaic energy every year for ten (10) years."

Use data for the average cost of a household to have solar photovoltaic energy. Clarify whether this means providing hot water and electricity with solar panels on the roof of a house, or constructing distribution centers that convert solar to electricity in a "regional" distribution of electricity to so many households.

GUIDELINES FOR REPORT FORMAT:

Papers must be typed, double-spaced (12 point type) on one to two pages. Tables or charts can be appendices. If necessary, some calculations can be presented by carefully printing of this information.

DEADLINE:

Papers must be submitted by ***Friday, December 1, 2011.***

The Pact:
An Introspective Presentation on the Qualities for Success in College

Each group will create a PowerPoint presentation that discusses the educational significance of the major themes found in The Pact. For this assignment, focus on the question, how can you use ***The Pact*** to help you continue to be successful in college? On a smaller scale, you are creating *Pact(s)* with classmates and life-long friends to facilitate your success in college. While creating your presentation, answer the following questions:

- Consider the traits and characteristics that the 3 Doctors possess(ed) to make ***The Pact*** successful?
- What are some "must haves" that must comprise your strategic plan to map out your success while in college?
- While in college, you will participate in various group activities, such as this. How can the ideas and philosophies expressed in ***The Pact*** be used in selecting group members to ensure good grades on assignments and ultimate graduation?
- What traits should you look for in students (as group members and/or life-long friends) so that your *Pact* will be successful?
- When selecting people to form a Pact, which is the most important (a) finding someone from your same ethnic background or (b) finding someone who has some of your life experiences? (An important issue to consider especially for those who will be entering fields in which they are underrepresented based on race/ethnicity.)
- When selecting people to form a *Pact*, is success based on same gender member (which is the case with the 3 Doctors) or can a Pact be formed with mixed gender participants? (An important issue to consider especially for those who will be entering fields in which they are underrepresented based on gender.)
- Any historical data or experiences specific to your intended discipline can be used to highlight your group's perspective.

The presentation must be submitted electronically via CourseCompass and will be presented orally, in class, lasting no longer than 10 minutes. The due date, for submission, is the Monday after Thanksgiving by 3:00pm. The presentations will begin the Wednesday after Thanksgiving. The groups must consist of no more than four (4) students and no less than three (3). All group members must participate in the oral presentation. Groups consisting of more than four (4) members or fewer than three (3) members will lose 70 points before grading begins. Creativity is encouraged. All presentations must be original. In conclusion, the presentation must document the chapter (which identifies the doctor that is expressing the sentiment) and the page number of the comment that you are emphasizing.