Math Discussion Board (Informal Writing):

Math typically takes more time than many other subjects. It is important to make a plan about studying, completing homework, participating, asking questions, and more.

What is your plan? What is going to help ensure your successful? What can you do if you feel like it is not working out at any point?

Make a post answering these questions using specifics and details. Please make your post by 3 days after the semester starts. Please respond to at least one classmate no later than 5 days after the semester starts (I will give the specific date). We will then discuss as a class some key points. I look forward to a semester of success and learning with all of you!!

CCBC
Choose semester Choose year
School of Mathematics and Science
Mathematics Department
Pre-Calculus I, MATH 163, Section Type Section Code, Course Reference Number (CRN) Type CRN

Contents

Senate Policy #20-12 approved: June 2, 2020

Course Description and Pre-/Co-requisites

Description: MATH 163 – Pre-Calculus I explores the nature and scope of college mathematics through the study of functions. Topics include the study of

polynomial, rational, radical, piece-wise defined, and absolute value functions and their graphs and applications as well as modeling with these functions. Additional topics include complex numbers, inverse functions, operations with functions, exponential and logarithmic functions and their graphs and applications.

This is a writing-mindful course, which means that we will use writing as a tool for thinking about the course content critically and will focus on writing to communicate more information about our work as we would do in research and the business world. There will be variety of assignments with a writing component this semester.

Prerequisite: ACLT 052 or ACLT 053; and (Algebra I and II in high school and a satisfactory score on the placement exam) or MATH 083

A. Basic Course Information

1. Instructor's name: Type name
2. Instructor's office room number: Type campus, building, and room number
   Phone number: Type phone number
   Email address: Type email address
3. Instructor's office hours: Type office hours and an optional statement of availability (to give students an appropriate expectation of the instructor's availability).
4. Response time and form of preferred communication: Type your statement of response time for email (CCBC email vs. Learning Management System messages) and phone calls. The suggested response time is 24 – 48 hours.
5. Department or school phone number(s): Choose the campus department number from the drop down list.
6. Class meeting day(s), time(s), and location(s):
   Select the modality (on-campus face-to-face OR remote synchronous) from the drop down list.
   Type meeting days(s), time(s), location(s) including campus/full building name/room number OR video conferencing details.
7. Statement of student out-of-class work expectations: This is a three-credit/billable hour course offered over Choose the number of weeks with corresponding outside of class expectations. hours of work per week outside of class time including reading, course preparation, homework, studying, etc.
8. Testing center/remote proctoring requirements: Replace this text with information about proctoring requirements such as required on-campus testing, proctoring software, etc. OR type 'Not applicable'.

9. Materials:
   Textbook: College Algebra & Trigonometry, by Miller and Gerken, 1st edition or an ALEKS Access Code
   Calculator: A graphing calculator TI-83 or TI-84 is recommended, but not required, for this course. Calculators with advanced capabilities, such as a TI-89, are not permitted.
10. Technical Requirements:
    Two boxes are shown below: one with REMOTE technical requirements and one with ON-SITE technical requirements.
    1. DELETE the entire box that does NOT correspond to course modality. To DELETE a box, right click within the box and select "Remove Content Control".
    2. Then DELETE this Instructions box by right clicking and selecting "Remove Content Control".

    To learn in a remote format at CCBC, you will need:
    - A reasonable level of computer literacy.
    - Regular access to a reliable computer desktop, laptop, netbook, etc.
        - Mobile devices cannot be used.
        - Must have a camera feature.
    - A stable broadband Internet connection.
    - A CCBC email account (free when you enroll).
    - Access to Blackboard learning management system.

    To learn on-site at CCBC, you will need:

    - Regular access to a reliable computer desktop, laptop, netbook, etc.
    - A stable broadband Internet connection.
    - A general understanding of the Blackboard learning management system.

    For the full list of technical requirements, check CCBC's Online Learning Technical Requirements.
    Students must notify the instructor immediately if any technical difficulties occur at any time during the semester AND should also have a plan in place for backup arrangements in such instances.

11. Other material related to Basic Course Information: Replace this text with other Basic Course Information OR type ‘Not applicable’.

B. Course Goals Overall

1. Course objectives as listed on the official Common Course Outline
   Upon completion of this course the student will be able to:
   a. produce and compare graphs of absolute value and piecewise-defined functions;
   b. solve inequalities in one and two variables;
   c. solve absolute value inequalities in one variable;
   d. identify domain and range of functions;
   e. produce and compare graphs of functions, using translations, symmetry, end behavior, and asymptotes;
   f. combine two or more functions using addition, subtraction, multiplication, division, or functional composition;
   g. identify the inverse of a given function;
   h. identify the function, given information about the function;
   i. model numerical data using quadratic functions to further analyze data and predict values;
   j. perform operations with functions;
   k. produce and compare graphs of exponential and logarithmic functions;
   l. solve problems using exponential and logarithmic functions;
   m. produce and compare graphs of polynomial functions;
   n. identify the zeros of polynomial functions; apply the Fundamental Theorem of Algebra;
   o. identify the equation of a polynomial using the Theory of Equations and given sufficient information about its zeroes;
   p. solve rational equations;
   q. produce graphs of rational functions;
   r. construct a solution to real world problems using problem methods individually and in groups;
   s. examine the mathematical contributions made by people from diverse cultures throughout history;
   t. articulate a solution to mathematical problems; and
   u. apply appropriate technology to the solution of mathematical problems.
2. Major topics as listed on the official Common Course Outline
   a. Absolute value equations and inequalities
      i. Absolute value equations

ii. Absolute value inequalities

b. Functions
    i. Review domain, range, and functional notation
    ii. Modeling data with linear regression function
    iii. Review parallel and perpendicular functions
    iv. Review quadratic functions and their graphs
    v. Graphing techniques using shifting/stretching techniques
    vi. Absolute value and piecewise defined functions and their graphs
c. Polynomial Functions
    i. Graphs of polynomial functions
    ii. Zeros of polynomial functions
    iii. Complex numbers and theory of equations
    iv. Fundamental Theorem of Algebra
    v. Modeling with polynomial functions
d. Rational Functions and Radical Functions
    i. Graphs of rational functions
    ii. Graphs of radical functions
    iii. Equations and inequalities of rational and radical functions
e. Combinations of Functions
    i. Arithmetic operations on functions
    ii. Composition of functions
    iii. One-to-one functions
    iv. Inverse functions
f. Exponential and Logarithmic Functions
    i. Definition and graphs of exponential functions
    ii. Definition and graphs of logarithmic functions
    iii. Properties of logarithms
    iv. Solving exponential and logarithmic equations
    v. Applications of exponential and logarithmic functions

3. Rationale: Pre-Calculus I is the first course in the Calculus track. The students will be introduced to the basics of linear and quadratic equations and inequalities, basic polynomial and rational functions, transcendental functions, and exponential and logarithmic functions. This course is a prerequisite for Pre-Calculus II and will lay the groundwork for the more intensive topics covered in that course.
4. Other material related to Course Goals: Replace this text with other Course Goals Information OR type ‘Not applicable’.

C. Evaluation

1. Requirements:
   Replace this text with evaluation requirements for your class.

   There is a minimum requirement of a written project, two tests, and a comprehensive final exam.

   Written project should be applications based and make up at least 10% of the course grade. Students are required to utilize appropriate academic resources when completing their projects.

   70% of the course grade must be represented by proctored assignments. Therefore, non-proctored work should not exceed 30% of the course grade.

2. Instructor's grading policy: The course grade will be determined as follows:
   Fill in the table below. Do NOT change the formatting of the first row. You may add/delete rows within the body of the table if needed.
   Replace this text with details about the specific items included in the course grade. Deadlines must be included for all assessments and major assignments. If you choose to provide these details in a separate document, include a statement here directing students to that document. That document must be shared with students in the same manner and at the same time as the syllabus.

Course Requirements	**Weight/Points**
Tests	
Project	
Comprehensive Final Exam	
Total	100 %

A final course grade will be assigned using the following criteria:

Course Average	**Course Grade**
At least 90%	A
At least 80% and less than 90%	B
At least 70% and less than 80%	C
At least 60% and less than 70%	D

Course Average	Course Grade
Less than 60%	F

3. Mathematics Department attendance policy:
   a. You are expected to attend all scheduled classes.
   b. Attendance is critical to student success in college.
   c. Satisfactory attendance is defined to be at most six hours of unexcused absences.
   d. Documentation of the reason for your absence(s) may be required.
   e. The instructor may count each unexcused tardy arrival as an absence and each unexcused early departure as an absence.
4. Mathematics Department audit policy: Students may change from credit to audit only during the published 50% refund period, as indicated in the CCBC academic calendar. Students who audit are required to attend class, participate in course activities, and complete assignments (except for tests and the final exam) in accordance with instructor guidelines and due dates. For students who do not meet these requirements, the instructor may change their grade from AU to W.
5. Other material related to Evaluation:
   Replace this text with details about evaluation policies such as testing, late work, make-up work, etc. OR type “Not applicable”.

D. Course Procedures

1. Course-related policies and procedures:
   Replace this text with details about course policies such as classroom expectations, cell phone policies, etc. Include any course-specific hyperlinks in the same format as all other hyperlinks in this template, with full URLs at the end of the document. Ask for assistance if needed.
2. College-wide syllabus policies: For college-wide syllabus policies, such as the Code of Conduct for Academic Integrity, Grades and Grading (including FX and progress grades), and the Audit/Withdrawal policies, please go to the MySyllabiPolicies tab on the myCCBC page.
3. College-wide student services: To access information about student services, such as Academic Advising, College and Community Outreach/Success Navigators, and Disability Support Services, students may refer to the Student Support Services link on the CCBC catalog home page.
4. Contact information for course-related concerns:

Students should first attempt to take concerns to the faculty member. If students are unable to resolve course-related concerns with the instructor, they should contact Choose the campus coordinator from the drop down list.

5. Course calendar/schedule: See item C.2. above (Evaluation – Instructor's Grading Policy) for location of due dates for all major assignments. Refer to the CCBC website for the complete Academic Calendar and Final Exam schedule for the semester.
6. Expected end date for access to the course via the Learning Management System:
   Replace this text with LMS end date when students will no longer be able to access the course.
7. Final Exam: The Final Exam date/time for this course is Replace this text with Final Exam date and time.
8. Other material related to Course Procedures: Replace this text with other Course Procedures OR type 'Not applicable'.

This syllabus may be changed with notification to the class.

MATH 163
Applications Project

Pre-Calculus I is a general education course designed to assist students in the development of critical life skills. One of the goals of this assignment is to assess student competence for each of these objectives:

I. **Written and Oral Communication**— articulate a solution to mathematical problems (CCO20),
II. **Critical Analysis and Reasoning**— produce and compare graphs of functions, using transformations, symmetry, end behavior, and asymptotes (CCO16),
III. **Technological Competence—** apply appropriate technology to the solution of mathematical problems (CCO21),
V. **Scientific and Quantitative or Logical Reasoning—** identify domain and range of functions (CCO4), and
VII. **Personal and Professional Ethics**— construct a solution to real world problems using problem solving methods individually and in groups (CCO18).

In addition to the above general education objectives, this assignment assesses students' understanding and application of the following skills and knowledge specific to ***applications of linear equations and modeling:***

- Modeling data with linear regression function

ASSIGNMENT:
Over the last decade, at least, there has been much talk about climate change. There have been discussions concerning the role humans have played in the altering of Earth's atmosphere, and the real and potential impact on life as we have come to know it. Finally, there have been attempts already made to stop or reverse any negative results that may have been or that may be caused as humans continue to produce and consume goods and services in our ever-expanding societies.

In this assignment you will have the opportunity to investigate four scenarios related to the issues climate change.

Purpose: The purpose of this assignment is to provide you, the student, with an opportunity to demonstrate your level of mastery of the mathematical and logical concepts that are presented in this pre-calculus course.

Audience: The audience for this assignment is your pre-calculus professor, or any individual with a sound knowledge of the topics covered in the questions posed along with each scenario.

Directions: Please respond to all parts of each scenario with complete ideas and sentences. Be clear and succinct in your submissions. Show all mathematical steps required, and answer questions in writing where asked. Also, make sure to provide all required technology displays or output.

ASSIGNMENT SPECIFICATIONS:

- This assignment will be at least 7 pages without including the title page and reference page.
- Please include an appropriate title page, font, and margins. Directions can be found on the CCBC library page. The title page and Reference page are part of the project. The title page will include the name of the project, the date, course number, course section & your CCBC ID number (your name will be on the second copy you submit). The reference page will list all of your references in APA format. An APA reference if needed: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html
- Please delete these directions on pages 1,2, &3. Keep the four project problems. You will answer each problem below the question asked.
- Cut and paste all technology displays (such as graphs you made online) and outputs, as needed, directly into the final document. Instructions on how to use Desmos.com to create graphs for free online are below under "Submission Guidelines."
- Utilize academically appropriate resources such as those found in library databases and elsewhere on the internet

GRADING:

- This assignment will account for ***10%*** of the total course grade.
- See attached rubric for details about how your essay will be graded

SUBMISSION GUIDELINES:

- **Due date for review of your title page and problem #2 only *[insert due date]*** *During this review, I will check to see if your title page is complete, if you are including all the math work for problem #2 and if you have accurately included a chart and a picture of your online graph. This will be 10 points towards your grade.*
- **Due date for final project: *[INSERT DUE DATE]***
- For paper submissions, please include the title of your project, your student ID, course number and section (omit student and faculty names).
- Electronic submissions should be made with the student's ID number (900 or 901#) as the file name through Blackboard. You will upload your project in the Bb assignment link BY***:[insert date]***

Instructions on how to use Desmos to sketch a graph of an equation, to make a table and plot points, and to find an equation that fits your data.

1. To create a new graph, Go to Desmos.com and just type your expression in the expression list bar. As you are typing your expression, the calculator will immediately draw your graph on the graph paper. You can graph a single line by entering an expression like y = 2x + 3.
2. Finding an equation that best fits your data in Desmos
   a. Go to Desmos.com and choose **Start Graphing**.
   b. Click the plus sign in the upper left and choose **Add Item** > **table**
   c. Type your data in the table.
   d. Click on the **wrench** in the upper right to change the graph settings.
   e. Modify your x, and y values to reflect your data.
   f. Adjust the values of the sliders until the graph of the equation most closely fits your data points.
   g. On the DESMOS Calculator, type $y = mx + b$ and select all to access the sliders to adjust the slope m and y-intercept b. Please use the following links for more directions on how to use DESMOS to sketch a graph of an equation, to make a table and plot points, and to find an equation that fits your data. Below are online videos that will help with explanation. Watch them in order. Please copy and paste the following links to the google site to avoid any possible error.

Helpful videos:

https://learn.desmos.com/tables
https://learn.desmos.com/graphing
https://www.youtube.com/watch?v=4NTf551hHQE

Math 163 Applied Project

1) Carbon Dioxide Emissions

Carbon emissions contribute to climate change, which has serious consequences for humans and their environment. According to the U.S. Environmental Protection Agency, carbon emissions, in the form of carbon dioxide (CO_2), make up more than 80 percent of the greenhouse gases emitted in the United States (EPA, 2019). The burning of fossil fuels releases CO_2 and other greenhouse gases. These carbon emissions raise global temperatures by trapping solar energy in the atmosphere. This alters water supplies and weather patterns, changes the growing season for food crops, and threatens coastal communities with increasing sea levels (EPA, 2016).

The amount of CO_2 emitted per year A (in tons) for a vehicle that averages x miles per gallon of gas, can be approximated by the function $A(x) = 0.0089x^2 - 0.815x + 22.3$.

a) Determine the average rate of change of the amount of CO_2 emitted in a year over the interval [20, 25], and interpret its meaning.

b) Determine the average rate of change of the amount of CO_2 emitted in a year over the interval [35, 40], and interpret its meaning.

c) Provide an interpretation of the difference between the values found in parts a) and b) and state the implications in the context of vehicle emissions of CO_2.

(Department of Energy, 2019)

2) Carbon Dioxide Change

As humans continue to burn fossil fuels, the amount of CO_2 in the atmosphere increases. Scientists measure atmospheric CO_2 in parts per million (ppm), which means the number of CO_2 molecules for every one million molecules of other atmospheric gases such as oxygen and nitrogen. Scientists have been tracking the amount of CO_2 in the atmosphere at the Mauna Loa Observatory in Hawaii since 1958.

The table below shows the CO_2 measurements recorded for the years 1959-2018.

Year	Mean	Year	Mean	Year	Mean	Year	Mean	Year	Mean
1959	315.97	**1972**	327.45	**1985**	346.12	**1998**	366.70	**2011**	391.65
1960	316.91	**1973**	329.68	**1986**	347.42	**1999**	368.38	**2012**	393.85
1961	317.64	**1974**	330.18	**1987**	349.19	**2000**	369.55	**2013**	396.52
1962	318.45	**1975**	331.11	**1988**	351.57	**2001**	371.14	**2014**	398.65
1963	318.99	**1976**	332.04	**1989**	353.12	**2002**	373.28	**2015**	400.83
1964	319.62	**1977**	333.83	**1990**	354.39	**2003**	375.80	**2016**	404.24
1965	320.04	**1978**	335.40	**1991**	355.61	**2004**	377.52	**2017**	406.55
1966	321.38	**1979**	336.84	**1992**	356.45	**2005**	379.80	**2018**	408.52
1967	322.16	**1980**	338.75	**1993**	357.10	**2006**	381.90		
1968	323.04	**1981**	340.11	**1994**	358.83	**2007**	383.79		
1969	324.62	**1982**	341.45	**1995**	360.82	**2008**	385.60		
1970	325.68	**1983**	343.05	**1996**	362.61	**2009**	387.43		
1971	326.32	**1984**	344.65	**1997**	363.73	**2010**	389.90		

(Source: U.S. Department of Commerce/National Oceanic & Atmospheric Administration. https://www.esrl.noaa.gov/gmd/ccgg/trends/data.html)

a) Use these data to make a summary table of the mean CO_2 level in the atmosphere as measured at the Mauna Loa Observatory for the years 1960, 1965, 1970, 1975, …, 2015. *(Note: This is a chart like the one above with only part of the data…a summary).*

b) Define the number of years that have passed after 1960 as the predictor variable *x*, and the mean CO_2 measurement for a particular year as y. Create a linear model for the mean CO_2 level in the atmosphere, $y = mx + b$, using the data points for 1960 and 2015 (round the slope and y-intercept values to three decimal places). Use Desmos to sketch a scatter plot of the data in your summary table and also to graph the linear model over this plot. *(This graph should be attached below).* In a few sentences comment on how well the linear model fits the data.

c) Looking at your scatter plot, choose two years that you feel may provide a better linear model than the line created in part b). Use the two points you selected to calculate a new linear model and use Desmos to plot this line as well. Provide this linear model *(use $y=mx+b$)* and state the slope and y-intercept, again, rounded to three decimal places.

d) Use the linear model generated in part c) to predict the mean CO_2 level for each of the years 2010 and 2015, separately. Compare the predicted values from your model to the recorded measured values for these years. *Show your math steps as always*. What conclusions can you reach based on this comparison?

e) Again, using the linear model generated in part c), determine in which year the mean level of CO_2 in the atmosphere would exceed 420 parts per million. *Please show all math work as always.*

3) Sea-Level Rise

The Arctic ice cap is a large sheet of sea ice that contains an estimated 680,000 cubic miles of water. If the global climate were to warm significantly as a result of the greenhouse effect or other climactic change, this ice cap would start to melt (NASA, n.d.). More than 200 million people currently live on land that is less than 3 feet above sea level. There are several large cities in the world that have a low average elevation, including Miami, Florida (pop. 463,347) at 7 feet, Shanghai, China (pop. 24,180,000) at 13 feet, and Boston, Massachusetts (pop. 685,094) at 14 feet. In this part of the project you are going to estimate the rise in sea level if the ice cap were to melt and determine whether this event would have a significant impact on the people living in these three cities (US Government, 2019).

PLEASE be sure to show all math work for each below:

a) The surface area of a sphere is given by the expression $A = 4\pi r^2$, where r is its radius. Although the shape of the earth is not exactly spherical, it has an average radius of 3,960 miles. Estimate the surface area of the earth to the nearest million square miles.

b) Oceans cover approximately 71% of the total surface area of the earth. How many square miles of the earth's surface are covered by oceans (again, rounded to the nearest million)?

c) Approximate the potential sea-level rise if half the Arctic ice cap were to melt. This can be done by dividing the volume of water from the melted ice cap by the surface area of the earth's oceans. Convert your answer into feet.

d) Discuss what your approximation of the potential sea-level rise implies for the cities of Miami, Boston, and Shanghai.

e) The Antarctic ice cap contains approximately 6,300,000 cubic miles of water. Approximate the potential sea-level rise if half the Antarctic ice cap were to melt, and discuss the implications for the cities of Miami, Boston, and Shanghai.

4) Air Pollution Reduction - Cost-Benefit Analysis

Coal has long been a reliable source of American energy, but it comes with tremendous costs because it is *very* dirty. When coal is burned it releases a number of airborne toxins and pollutants, including mercury, lead, sulfur dioxide, nitrogen oxides, particulates, and various other heavy metals which can have harmful environmental impacts in addition to CO_2.

The function below relates the cost C (in \$1000) to remove *x* percent of the air pollutants for a hypothetical power company which burns coal to generate electricity. A function such as this is called a cost-benefit function because it relates a cost (the price of implementing practices to remove the pollution) and a benefit (the removal of the air pollutants from the energy-generating process).

$$C(x) = \frac{540x}{100 - x} \text{ for } 0 \leq x < 100$$

a) Use the above function to show that the cost of removing 40% of the air pollutants would be \$360,000. Then compute the cost (in dollars) for the company to remove 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, and 95% of the air pollutants. Organize your results in a table and make a scatterplot of the points using Desmos. What trend do you observe?

b) What would be the increased cost (in dollars) for the company if they were to add processes that would increase the amount of pollutants removed from 50% to 60%, from 60% to 70%, from 70% to 80%, and from 80% to 90%? Comment on any trend that may be noticed.

c) According to the cost-benefit function, would it be possible for the company to remove 100% of the air pollutants? Explain why this does or does not make sense.

d) The domain of $C(x)$ is restricted to $0 \leq x < 100$. Explain why this makes sense in the context of this model.

e) If the company decides they can reasonably budget \$2 million for pollution control, what percentage of air pollutants can be removed (to the nearest tenth of a percent)?

f) Sketch the graph of $C(x)$ (for $0 \leq x < 100$) using Desmos. What is the range of $C(x)$? Explain why the range makes sense in the context of the problem.

References:

EPA. (2016, December 20). Climate Change Impacts | US EPA. Retrieved December 13, 2019, from https://19january2017snapshot.epa.gov/climate-impacts_.html

EPA. (2019, May 13). Overview of Greenhouse Gases. Retrieved December 13, 2019, from https://www.epa.gov/ghgemissions/overview-greenhouse-gases

Department of Energy. (n.d.). Department of Energy. Retrieved December 13, 2019, from https://www.energy.gov/

United States Government. (2019, September 5). U.S. Geological Survey. Retrieved December 13, 2019, from https://www.doi.gov/hurricanesandy/usgs

NASA. (n.d.). Arctic Sea Ice Minimum | NASA Global Climate Change. Retrieved December 13, 2019, from https://climate.nasa.gov/vital-signs/arctic-sea-ice/

Math 163 project	Question	5 Exemplary:	3 Learning:	1 Beginning:	0 **Failing:** Missing content/task required for evaluation
Each part of every problem	1a__ 1b__ 1c__ 2a__ 2b__ 2c__ 2d__ 2e__ 3a__ 3b__ 3c__ 3d__ 3e__ 4a__ 4b__ 4c__ 4d__ 4e__ 4f__	Provides response that includes the interpretation using appropriate sentence structure and organization with clear communication of the intended message. No apparent errors present in the math work. Work is shown.	Provides response that includes reference to the interpretation using appropriate sentence structure and organization, but lacks in clarity so as to impede the communication of the intended message or minor errors in part of the math accuracy or math steps to be shown.	Provides response that includes reference to the interpretation but uses fragmented statements or contains multiple major issues that impede the communication of the intended message or multiple math errors that impede on the answer.	Provides no response at all. OR Provides response expressing unrelated and incomplete ideas and math work.
Title Page	First page__		Provides a title page with complete information	Provides a title page with some information missing.	Provides no response at all.
Reference page	Last page__	.	2 points Provides a reference page with at least 1 reference. Reference is in APA format.	Provides a reference page with at least 1 reference. Reference is not in accurate APA format.	Provides no response at all

Score: _____

Informal Scoring Tool

Criteria	***meets/exceeds expectations***	***Needs improvement***	***Unacceptable***
Discussion Content and Support	***(3points)*** Learner responds to discussion with thoughtful ideas; the learner clearly communicates ideas and opinions that are supported, and offered additional information.	***(1 point)*** The writing has some basic support of the topic, but is missing many crucial aspects.	***(0 points)*** Did not submit the assignment.
Discussion Responses	***(3points)*** There is at least 1 response that adds depth and detail to the original topic.	***(1 point)*** There is one reply but the response is very basic and lacks depth.	***(0 points)*** Did not submit a response.
Spelling and Grammer	***(1 point)*** Discussion is free of spelling, grammar, and/or punctuation errors. No slang or inappropriate language is used.	***(0.5 points)*** 2-4 errors are present in spelling, grammar, and/or punctuation, which may include slang or inappropriate language.	***(0 points)*** 5 or more errors are present in spelling, grammar, and/or punctuation, which may include slang or inappropriate language OR learner did not submit assignment.

Math Peer Review Protocol

As a peer reviewer, please answer the following questions about the paper you are reading.

1. Audience:
   Who seems to be the intended audience? What suggests that to you? What is this audience's interest in the mathematical information? Why might they care? Do you have ideas about how the writer might shift language and structure (and ideas?) to more effectively address this audience?
2. Introduction: Does the writer offer an overview that outlines the problem? Does the writer explain what s/he will do, and why? Does the writer give some context for the problem? Do you have ideas about what the intro might do that it doesn't, or what the writer might do differently?
3. Process: Did you get a sense of how the writer arrived at his/her mathematical conclusions? What process did s/he follow? Do you want a better sense of that process? Where and how might the writer incorporate that?
4. Specificity/Conciseness: Choose 1-2 sentences that seem "bulky" or less clear. As a group, re-work the sentences, paying particular attention to: use of pronouns (is the

antecedent clear), double negatives, active verbs (watch for 'ing" verbs and "would" verbs).

5. Transitions: Are you able to follow the logic of the mathematical problem? What connections is the writer making between ideas? Would repetition of the previous concept/term help to clarify? How about a transitional phrase or term?
6. Holes: Do you see any gaps in the writer's reasoning or ideas? Are there concepts or ideas or connections that you think could be clarified or strengthened?
7. Images to help the reader if applicable: How does the writer use graphics or images? What are these graphics or images being used to do? Is it clear how the graphics/images work with the text? Would you like more or fewer graphics/images? Why? Do you have ideas about how the writer might tighten the connection between the images/graphics and the written text?

Reflection

I am glad I got the chance to be a part of the Writing Fellows Program. I believe it has better prepared me to help students when it comes to different types of writing. I have learned that writing can truly be in so many different forms and ways. As long as we are writing in mathematics, it counts!

To start, in our Pre-Calc 1 course, we used a project last semester as our General Education Common Graded Assignment (GrEAT) project. There were directions for each part of the project, and a rubric for grading. After using it I realized that the rubric really didn't cover all of the parts of the project, and I worked on changing that during this course for my classroom grading. I also realized that the directions could have been more detailed and improved. I went in and gave specific links to webpages for APA formatting examples, and gave more detailed directions. With the discussions we did, I was also able to recall some assignments that I have used in the past that I would like to bring back into my classrooms.

I still need to improve in my courses for the future semesters. I would like to find a project in which there can be some type of peer review. This can be done in face to face classes, online remote, and online asynchronist classes. In face to face classes I believe it can be done as a small group. I will

give specific questions for the group members to answer for each project. The students do not have to be extremely knowledgeable about the math necessarily, but by reading the project they could express if there is more information that they would like to know for example. They can also discuss grammar, paragraphs, introductions, diagrams, and more.

I believe if I spend some time searching for articles and information on writing in mathematics I could also find more ways to incorporate writing into my specific classes. I want to make sure the writing fits in naturally, and doesn't seem forced. I want students to realize how frequently other subject areas are incorporated in with each other. No matter what their major is, I want to allow them to see that mathematics, writing, multicultural topics, science, and more, are all important in our careers.