The Taco Cart Inquiry Problem

If you need to watch the videos again, you can access them here: **http://threeacts.mrmeyer.com/tacocart/**

Here are some guidelines for your report on the *Taco Cart* Inquiry Problem we did in class.

- The report can be either as a PowerPoint or poster board.
- For all equations solved **graphically**, include a copy of the actual graph by graphing in **Desmos** and taking a screen snapshot.
- For all **algebraic** solutions, include a screen snapshot of the analysis done in the **Wolfram** app. This app can find the zeros, minimums, maximums, and derivatives. Wolfram is a very powerful tool that is being used more and more in College Math courses and by career Mathematicians to aid in the analysis of functions and equations.
- All functions and equations need to be supported by clearly labelled diagrams, and all variables defined very clearly.
- Each calculation needs to end with a sentence that clearly answers all questions posed in that part of the problem.

Part I

- **Guess who will reach the cart first and justify your guess.**
- What other information is required (and was given to you) in order to obtain a more definitive answer?
- How does this extra information affect your initial guess?
- Calculate the time taken by Ben and Me to reach the cart. Express your answer in minutes and seconds, e.g. *2min, 20sec.* (You don't need to verify this solution by graphing or Wolfram, as it is quite basic).

Part II

- **Determine the exact position of the cart on the road such that both Ben and Me will reach it at the exact same time.**
- Determine the **distances** Ben and Me would have to walk individually and their individual **times**.
- Express your solutions graphically and algebraically.

Part III

- **Determine an optimum path to the cart that results in the fastest time.**

- Express your solution Numerically, Graphically, and Algebraically.

- **Numerically**: Create 10 or more possible paths to the cart and calculate the times. Determine an interval of time that contains the fastest time. Use your level of enthusiasm for this problem to determine the detail of your analysis!

- **Graphically**: Setup an algebraic expression and determine the solution graphically. Make sure to clearly indicate the meaning of each variable used in the expression. Comment on the accuracy, or lack of, of your previous Numerical solution compared to the graphical.

- **Algebraically**: Use Calculus to determine a solution, showing all steps. Verify all your answers using Wolfram.

- Illustrate the optimum path with a clearly labelled diagram.

Part IV – Reflection

Briefly discuss the following:

- What parts of this Inquiry Problem did you enjoy the most and the least? Why? (I would prefer your honesty!)

- What skills/strategies did this problem help you to develop?

- How will these skills benefit your learning, current and future?

- What features of *Desmos* and *Wolfram Alpha* did you find the most useful?

Timeline:

Monday, January 26th   Parts I and II fully completed and rough draft of Part III

Friday, January 30th   Completed project due

NOTE: I __may__ move the date of the Unit 3 test from Tuesday to another day next week to allow time for you to work on the project and review for the test.