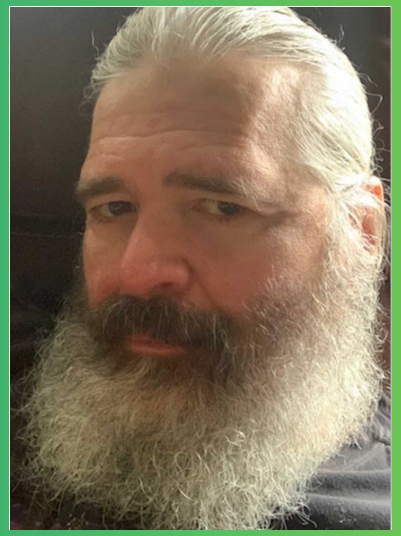
MAT 151 Calculus 1

Prof. Porter



Agenda

Introductions

Lecture-

- What is Calculus?
- Ave Rate of Change

Group work

151d1

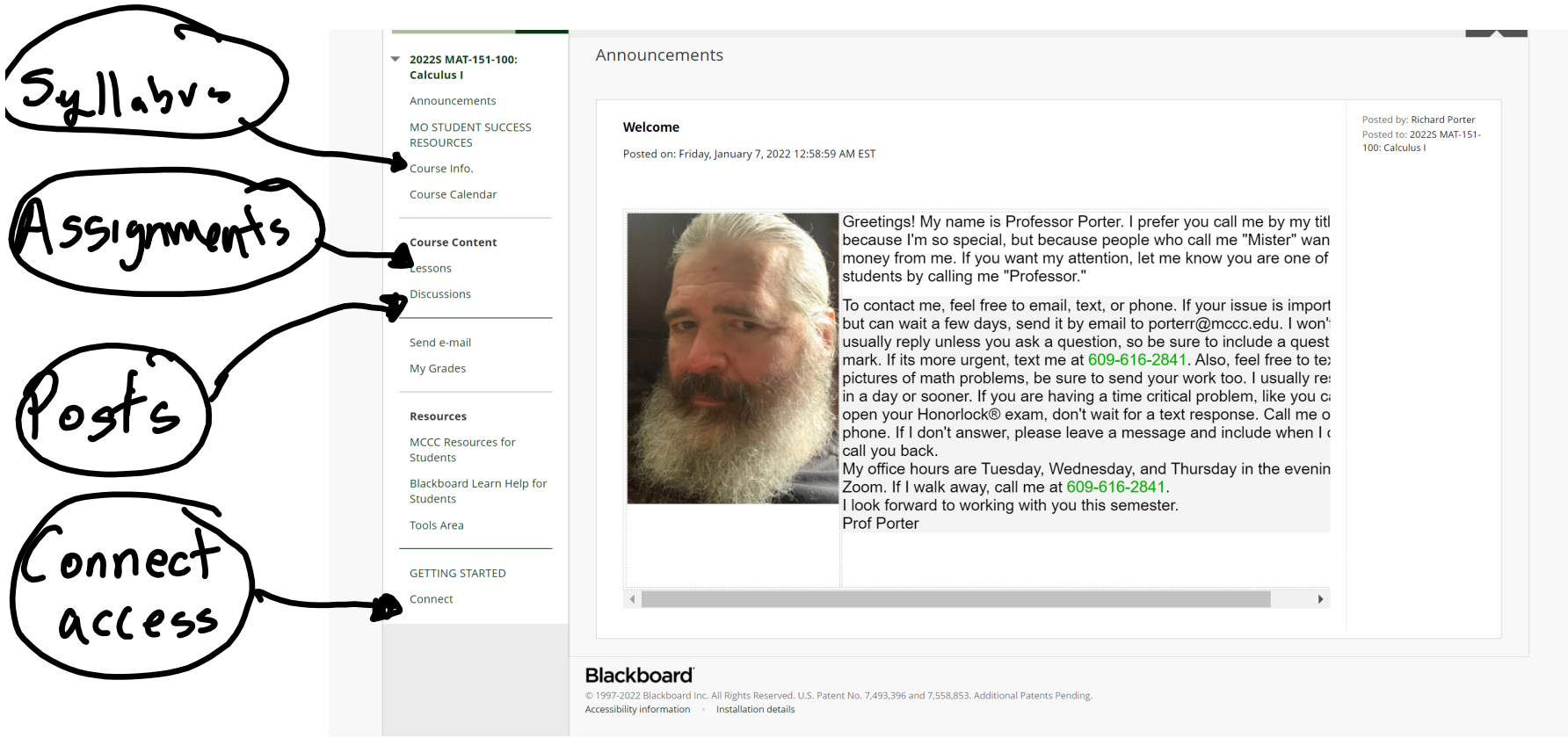
Introductions

-Course is in Blackboard and Connect

-Go thru Blackboard to get to Connect

-Discussions on Blackboard

-All other assignments on Connect


Syllabus
Assignments
Posts
Connect access
2022S MAT-151-100: Calculus I
Announcements
MO STUDENT SUCCESS RESOURCES
Course Info.
Course Calendar
Course Content
Lessons
Discussions
Send e-mail
My Grades
Resources
MCCC Resources for Students
Blackboard Learn Help for Students
Tools Area
GETTING STARTED
Connect
Announcements
Welcome
Posted on: Friday, January 7, 2022 12:58:59 AM EST
Posted by: Richard Porter
Posted to: 2022S MAT-151-100: Calculus I
Greetings! My name is Professor Porter. I prefer you call me by my titl
because I'm so special, but because people who call me "Mister" wan
money from me. If you want my attention, let me know you are one of
students by calling me "Professor."
To contact me, feel free to email, text, or phone. If your issue is import
but can wait a few days, send it by email to porterr@mccc.edu. I won'
usually reply unless you ask a question, so be sure to include a quest
mark. If its more urgent, text me at 609-616-2841. Also, feel free to te
pictures of math problems, be sure to send your work too. I usually re
in a day or sooner. If you are having a time critical problem, like you c
open your Honorlock® exam, don't wait for a text response. Call me o
phone. If I don't answer, please leave a message and include when I
call you back.
My office hours are Tuesday, Wednesday, and Thursday in the evenin
Zoom. If I walk away, call me at 609-616-2841.
I look forward to working with you this semester.
Prof Porter
Blackboard
© 1997-2022 Blackboard Inc. All Rights Reserved. U.S. Patent No. 7,493,396 and 7,558,853. Additional Patents Pending.
Accessibility information
Installation details

Catalog Description:

This is the first course in the standard integrated calculus sequence. Topics covered include differentiation and integration of algebraic and trigonometric functions. Applications include curve sketching, related rates, maxima and minima, and approximations, and calculation of areas and volumes of revolution. There is an emphasis on the theory of limits and continuity.

Prerequisites: MAT146 or MAT116 with minimum C grade

Required Materials:

Connect® software is required Internet Access to Desmos required for exams	Book: SMITH and MINTON, Calculus Early Transcendental Functions, 4th Ed.ISBN:0077864417 NOT required.

Instructor: Richard Porter

E-mail: porterr@mccc.edu	Office: Zoom ZOOM Meeting Access : 4461153665	Office Hours: Office schedule By appointment
Web Page: Homepage	Phone: 609-616-2841	Text: 609-616-2841

Grading:

Posts	**5%**
Homework	**10%**
Quizzes	**10%**
Tests (2)	**5%**
Midterm	**30%**
Final*	**40%**
Total	**100%**

***Must Receive a 50% on Final to pass course**

93%-100%.....A
90%-92%.....A-
87%89%.....B+
83%-86%.....B
80%-83%.....B-
77%-79%.....C+
70%-76%.....C
60%-69.5%.....D
<59.5%.....F

Assignments:

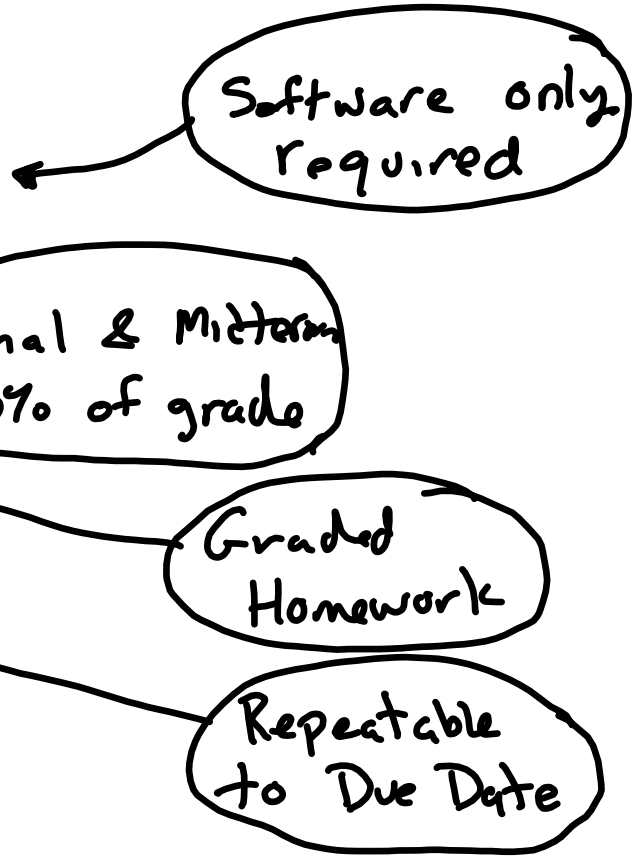
Assignments:	Repeatable?	Cumulative?	Help available?	Partial credit?
Posts (Discussions)	Weekly due date	No	After Submission	Yes
Homework	Exam due dates	No	After Each Question	None
Quizzes	Weekly due dates	No	After Due Date	None
-Practice	Exam due dates[1]	Exams	After Submission	None
Derivatives Test	No	No	After Due Date	Workpaper[2]
Integral Test	No	No	After Due Date	None
Midterm Exam	No	Yes	After Corrections	Requested[3]
Final Exam	No	Yes	No	Automatic[4]

[1]Practice Assignments are designed for you to practice taking tests and exams. They're like quizzes except they are timed and must be retaken in their entirety (No quick retakes).

[2]All workpaper must be ordered, questions clearly labeled, all work shown for every problem, and calculator steps outlined.

[3]Up to a week after the exam, student must explain why credit is requested for each individual question. Workpaper and Honorlock® recordings may be referenced.

[4]Workpaper will be automatically reviewed. Honorlock® recordings must be referenced to be considered.



LESSONS

Schedule for Semester

	Monday	Sunday			Tuesday	Friday
Week # 1	starts: 1/24/2022	ends: 1/30/2022	with discussion:	'selfie' due:	2/1/2022	and final draft due: 2/4/2022
Week # 2	starts: 1/31/2022	ends: 2/6/2022	with discussion:	'rates' and Quiz # 1 due:	2/6/2022	and final draft due: 2/9/2022
Week # 3	starts: 2/7/2022	ends: 2/13/2022	with discussion:	'limits' and Quiz # 2 due:	2/13/2022	and final draft due:2/16/2022
Week # 4	starts: 2/14/2022	ends: 2/20/2022	with discussion:	'derivative' and Quiz # 3 due:	2/20/2022	and final draft due:2/23/2022
Week # 5	starts: 2/21/2022	ends: 2/27/2022	with discussion:	'transdentals' and Quiz # 4 due:	2/27/2022	and final draft due: 3/2/2022
Week # 6	starts: 2/28/2022	ends: 3/6/2022	with discussion:	'mvt' and Quiz # 5 due:	3/6/2022	and final draft due: 3/9/2022
Week # 7	starts: 3/7/2022	ends: 3/20/2022	with discussion:	'error' and Quiz # 6 due:	3/20/2022	and final draft due:3/23/2022
Week # 8	starts: 3/21/2022	ends: 3/27/2022	with discussion:	'analysis' and Quiz # 7 due:	3/27/2022	and final draft due:3/30/2022
Week # 9	starts: 3/28/2022	ends: 4/3/2022	with discussion:	'proposal' due:	4/3/2022	and final draft due: 4/6/2022
Week # 10	starts: 4/4/2022	ends: 4/10/2022	with discussion:	'area/ave' and Quiz # 8 due:	4/10/2022	and final draft due:4/13/2022
Week # 11	starts: 4/11/2022	ends: 4/17/2022	with discussion:	'apprx area' and Quiz # 9 due:	4/17/2022	and final draft due:4/20/2022
Week # 12	starts: 4/18/2022	ends: 4/24/2022	with discussion:	'conclusion' and Quiz #10 due:	4/24/2022	and final draft due:4/27/2022
Week # 13	starts: 4/25/2022	ends: 5/1/2022				
Week # 14	starts: 5/2/2022	ends: 5/8/2022				
Week # 15	starts: 5/9/2022	ends: 5/11/2022				

Tests Due Dates:

Assignments:	Due:	
Derivatives Test	3/2/22	Wednesday
Midterm	3/27/22	Sunday
Integral Test	5/4/22	Wednesday
Final Exam	5/10/22	Tuesday

Honorlock

Honorlock online remote proctoring

Actual Due Date

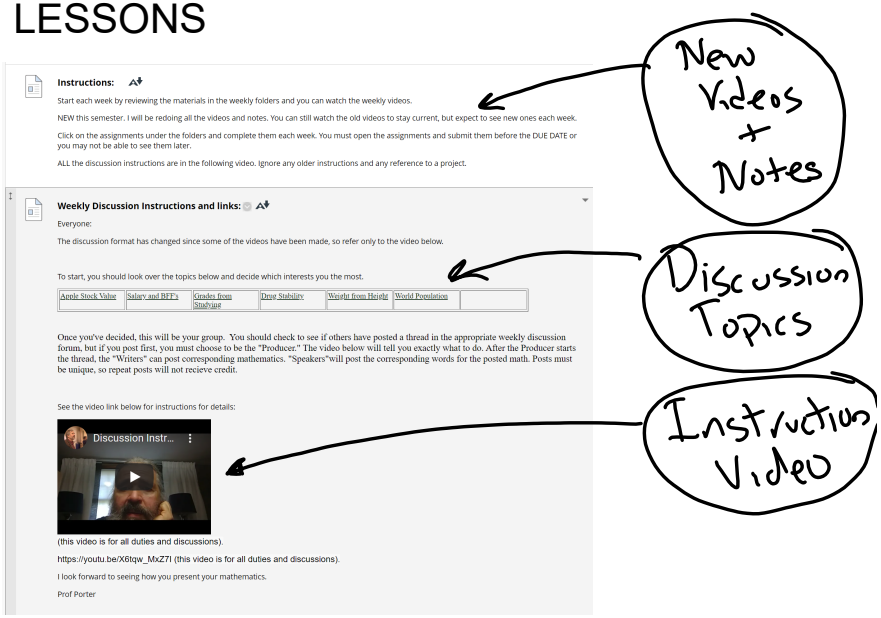
Final Draft Accepted

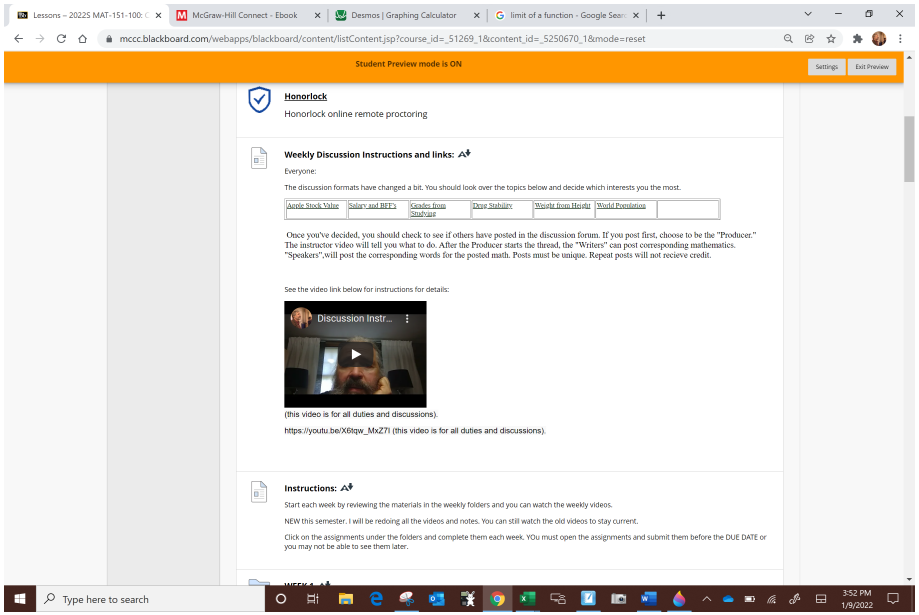
Make sure you can do these dates

Make sure you know Honorlock

Midterm + Final Only

LESSONS


New Videos + Notes
Discussion Topics
Instruction Video
Instructions:
Start each week by reviewing the materials in the weekly folders and you can watch the weekly videos.
NEW this semester. I will be redoing all the videos and notes. You can still watch the old videos to stay current, but expect to see new ones each week.
Click on the assignments under the folders and complete them each week. You must open the assignments and submit them before the DUE DATE or you may not be able to see them later.
ALL the discussion instructions are in the following video. Ignore any older instructions and any reference to a project.
Weekly Discussion Instructions and links:
Everyone:
The discussion format has changed since some of the videos have been made, so refer only to the video below.
To start, you should look over the topics below and decide which interests you the most.
Apple Stock Value
Salary and BFF's
Grades from Studying
Drug Stability
Weight from Height
World Population
Once you've decided, this will be your group. You should check to see if others have posted a thread in the appropriate weekly discussion forum, but if you post first, you must choose to be the "Producer." The video below will tell you exactly what to do. After the Producer starts the thread, the "Writers" can post corresponding mathematics. "Speakers"will post the corresponding words for the posted math. Posts must be unique, so repeat posts will not recieve credit.
See the video link below for instructions for details:
Discussion Instr...
(this video is for all duties and discussions).
https://youtu.be/X6tqw_MxZ7I (this video is for all duties and discussions).
I look forward to seeing how you present your mathematics.
Prof Porter


mccc.blackboard.com/webapps/blackboard/content/listContent.jsp?course_id=_51269_1&content_id=_5250670_1&mode=reset
Student Preview mode is ON
Settings
Exit Preview
Honorlock
Honorlock online remote proctoring
Weekly Discussion Instructions and links:
Everyone:
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Salary and BFF's
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Discussion Instr...
(this video is for all duties and discussions).
https://youtu.be/X6tqw_MxZ7I (this video is for all duties and discussions).
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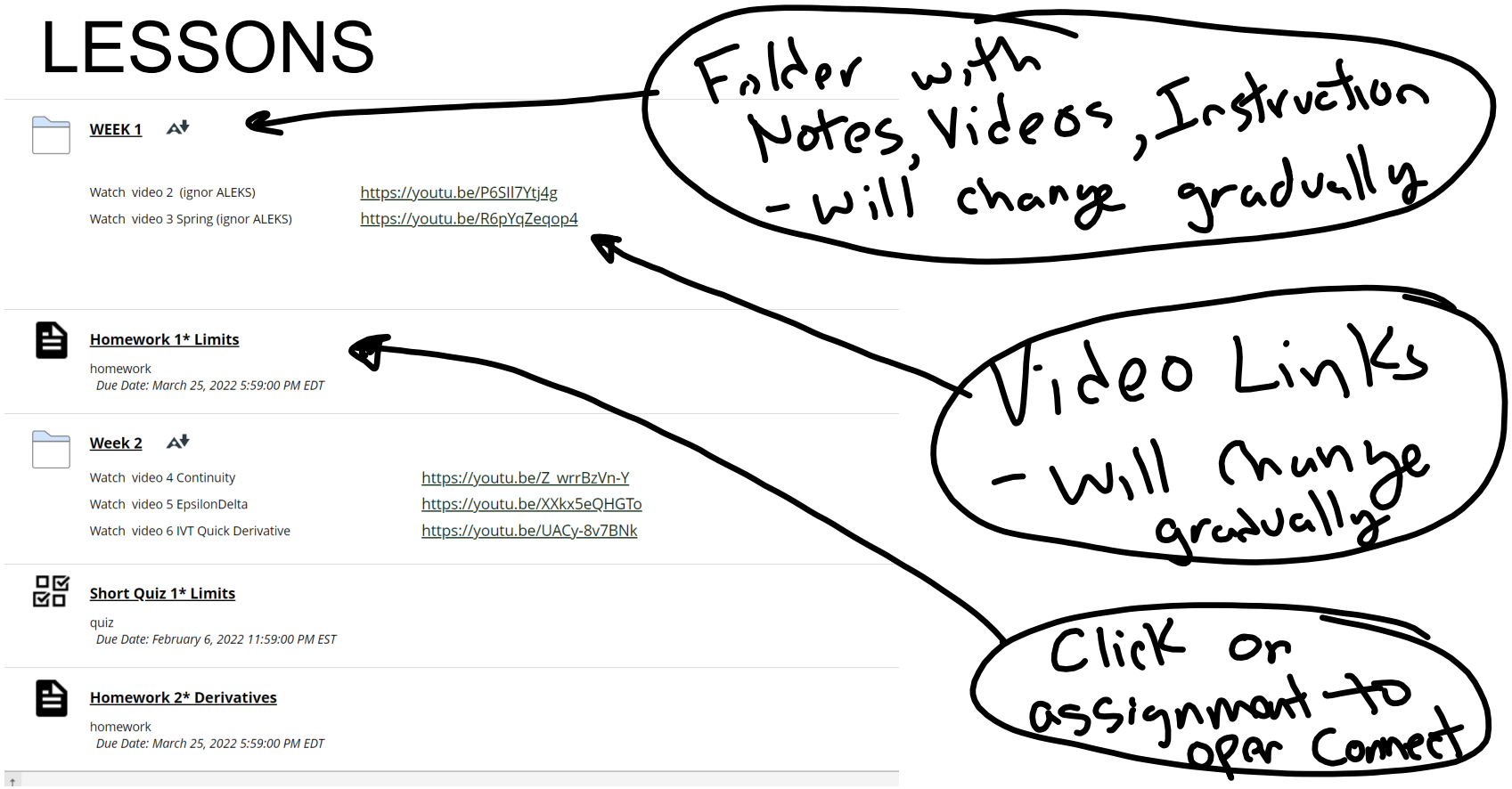
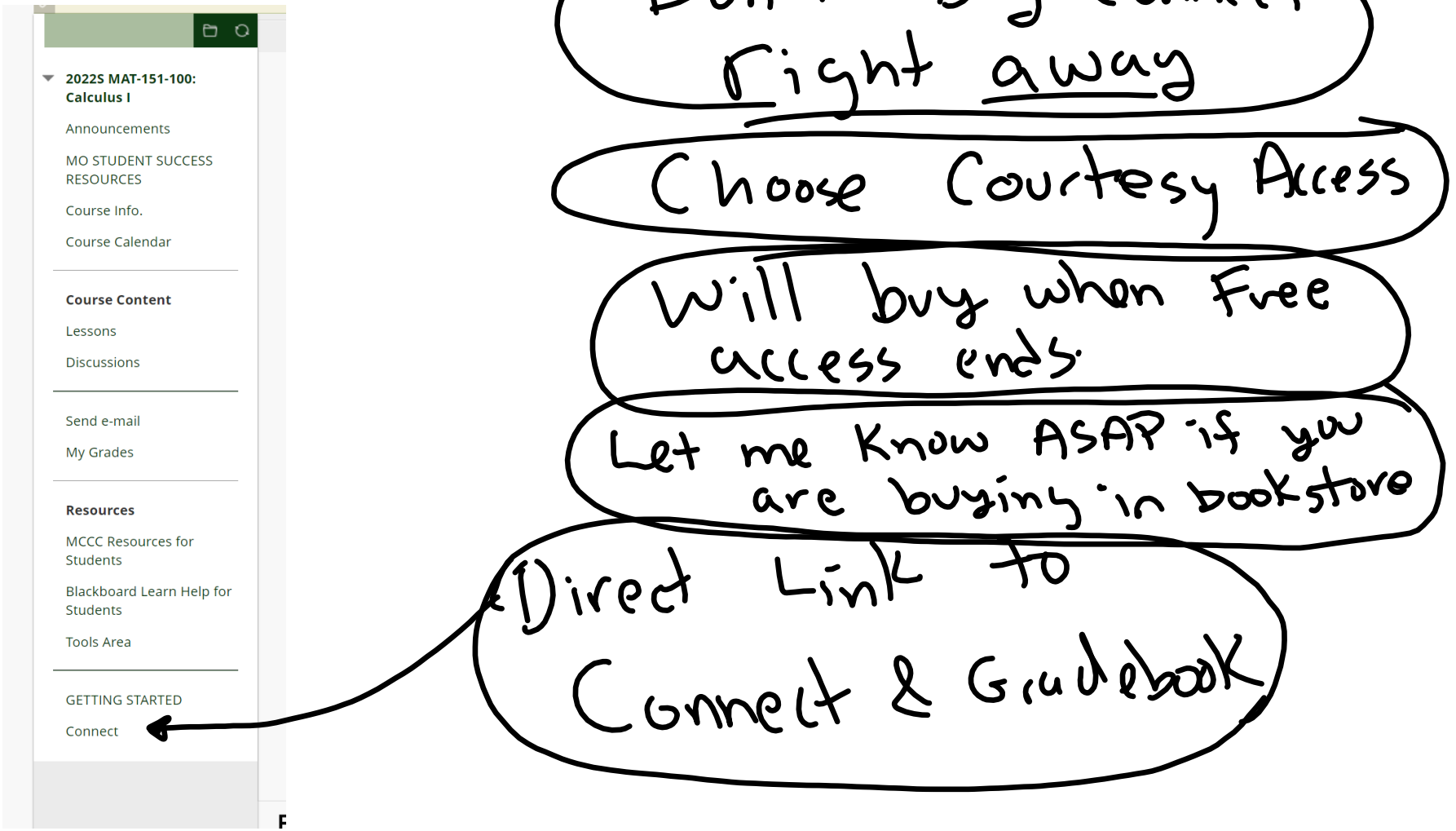
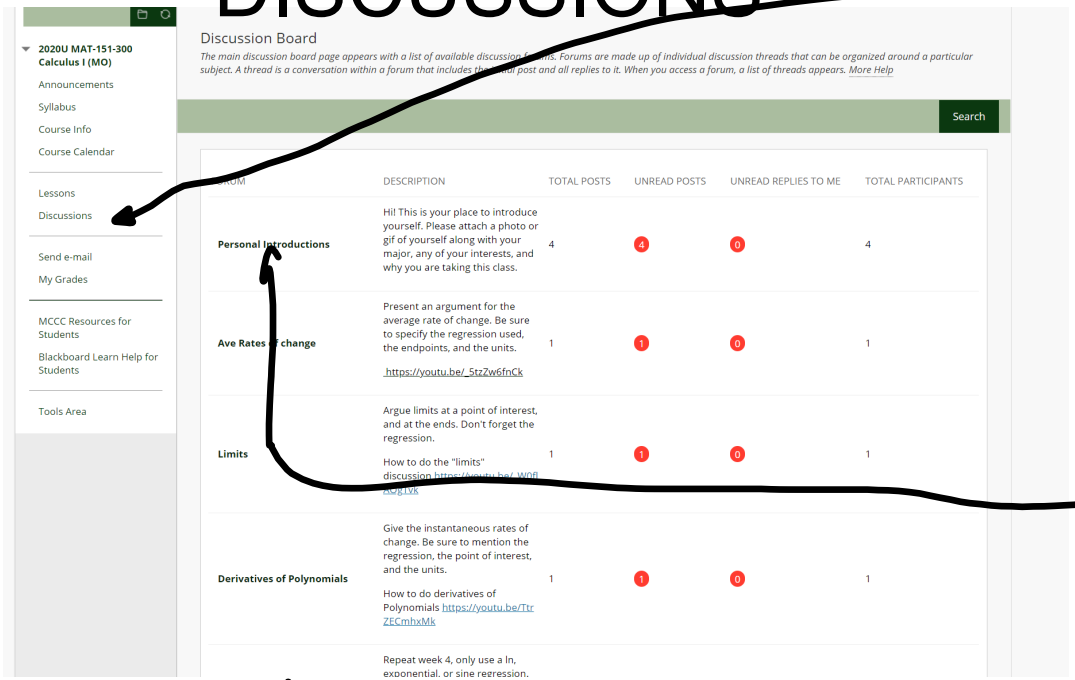
Click on the assignments under the folders and complete them each week. YOu must open the assignments and submit them before the DUE DATE or you may not be able to see them later.
Type here to search
3:52 PM
1/9/2022

LESSONS


WEEK 1
Watch video 2 (ignor ALEKS) https://youtu.be/P6SII7Ytj4g
Watch video 3 Spring (ignor ALEKS) https://youtu.be/R6pYqZeqop4
Homework 1* Limits
homework
Due Date: March 25, 2022 5:59:00 PM EDT
Week 2
Watch video 4 Continuity https://youtu.be/Z_wrrBzVn-Y
Watch video 5 EpsilonDelta https://youtu.be/XXkx5eQHGTo
Watch video 6 IVT Quick Derivative https://youtu.be/UACy-8v7BNk
Short Quiz 1* Limits
quiz
Due Date: February 6, 2022 11:59:00 PM EST
Homework 2* Derivatives
homework
Due Date: March 25, 2022 5:59:00 PM EDT
Folder with Notes, Videos, Instruction - will change gradually
Video Links - Will change gradually
Click on assignment to open Connect


2022S MAT-151-100: Calculus I
Announcements
MO STUDENT SUCCESS RESOURCES
Course Info.
Course Calendar
Course Content
Lessons
Discussions
Send e-mail
My Grades
Resources
MCCC Resources for Students
Blackboard Learn Help for Students
Tools Area
GETTING STARTED
Connect
Don't Buy Connect right away
Choose Courtesy Access
Will buy when Free access ends
Let me Know ASAP if you are buying in bookstore
Direct Link to Connect & Gradebook

DISCUSSIONS



Discussion Link

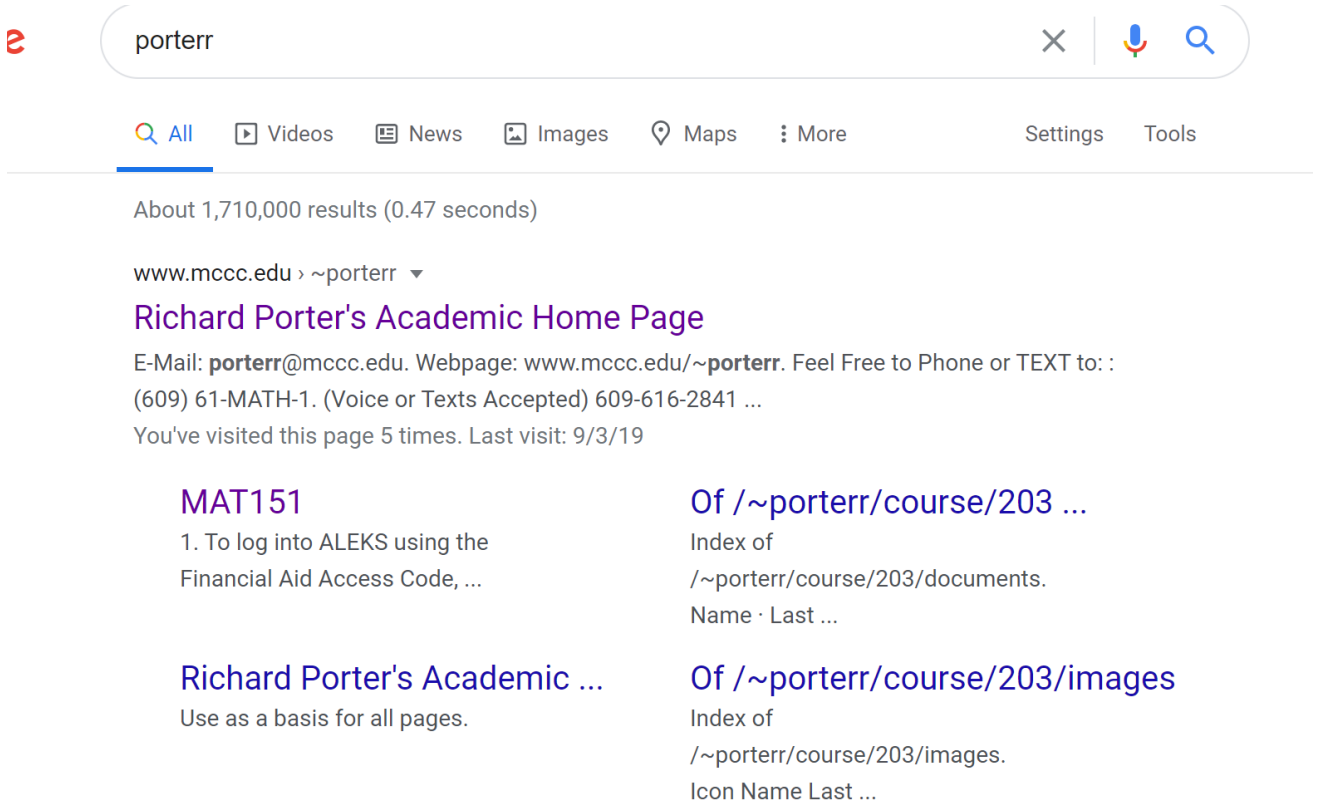
Weekly Topics

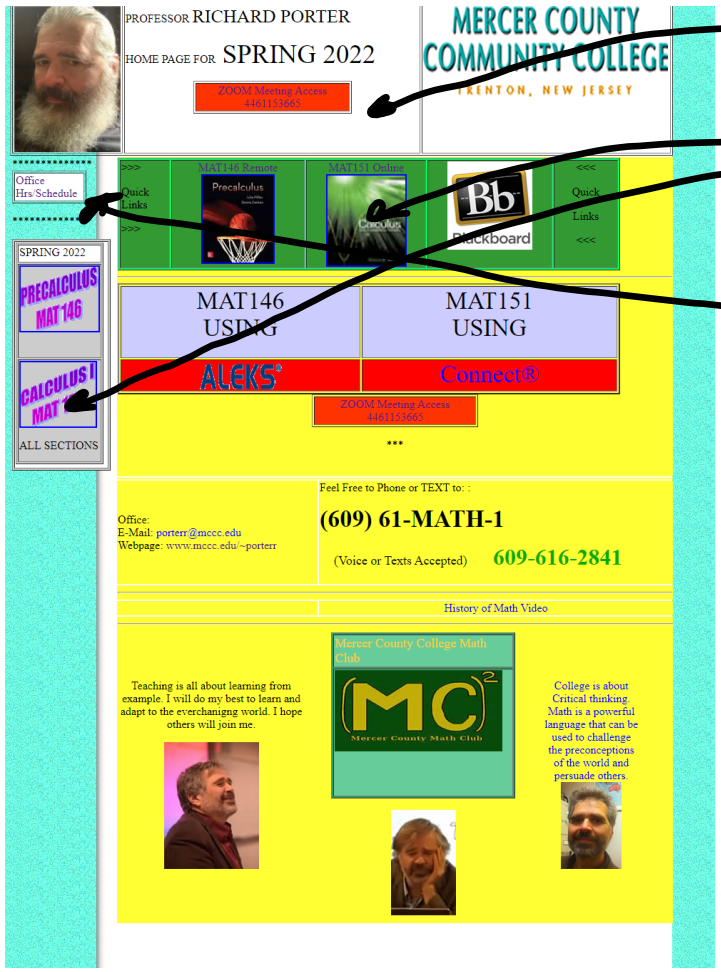
Click to open

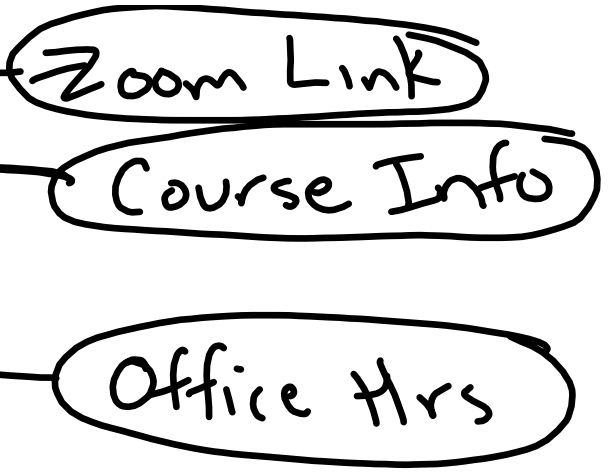
Watch Video for more info

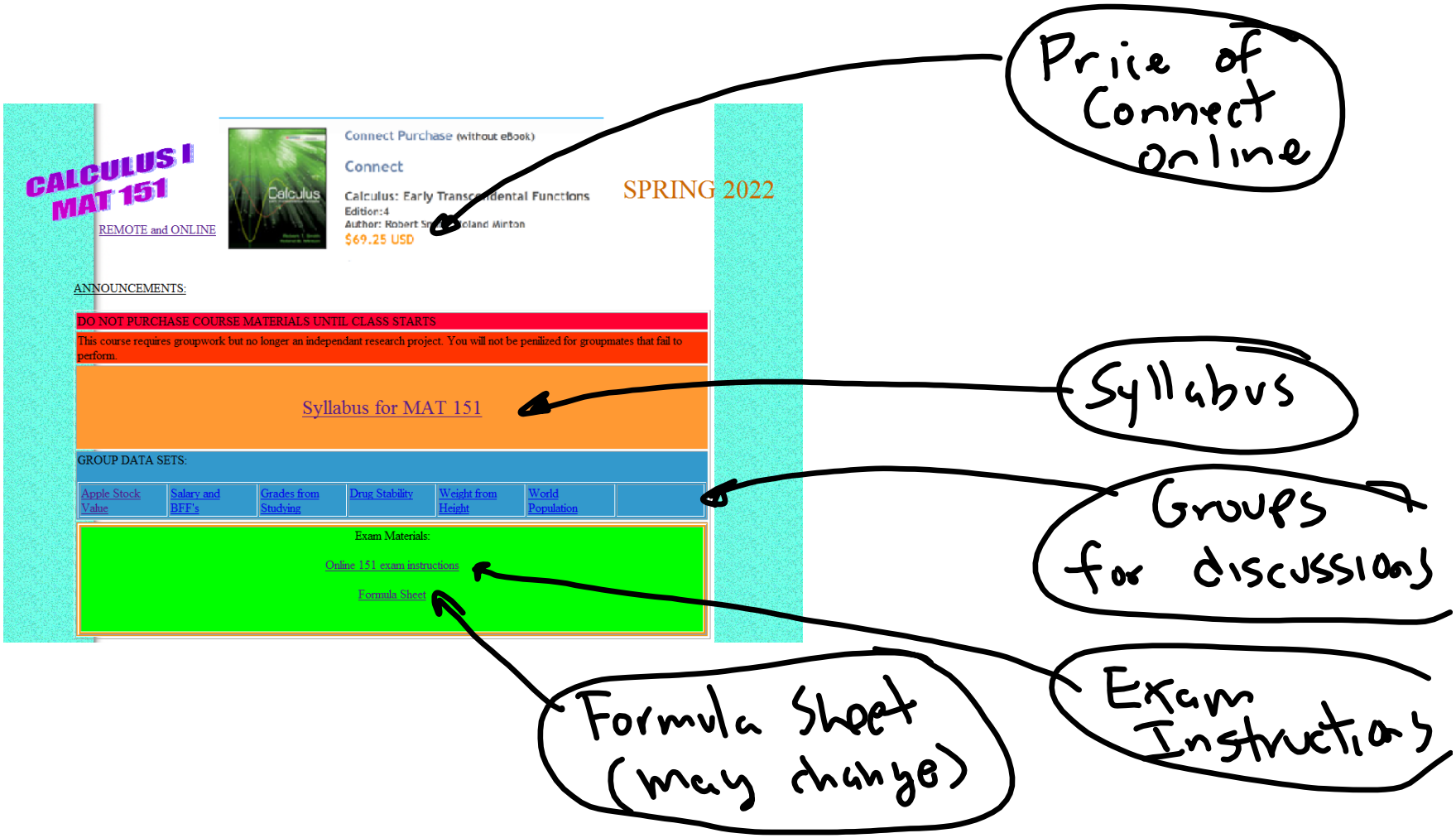
Not on Connect

If Blackboard is down...google my webpage




PROFESSOR RICHARD PORTER
HOME PAGE FOR SPRING 2022
ZOOM Meeting Access 4461153665
MERCER COUNTY COMMUNITY COLLEGE
TRENTON, NEW JERSEY
Office Hrs/Schedule
>>> Quick Links >>>
MAT146 Remote
MAT151 Online
Blackboard
<<< Quick Links <<<
SPRING 2022
PRECALCULUS MAT146
CALCULUS I MAT
ALL SECTIONS
MAT146 USING
ALEKS
MAT151 USING
Connect®
ZOOM Meeting Access 4461153665
***
Office:
E-Mail: porterr@mccc.edu
Webpage: www.mccc.edu/~porterr
Feel Free to Phone or TEXT to: :
(609) 61-MATH-1
(Voice or Texts Accepted)
609-616-2841
History of Math Video
Teaching is all about learning from example. I will do my best to learn and adapt to the everchaniging world. I hope others will join me.
Mercer County College Math Club
(MC)2
Mercer County Math Club
College is about Critical thinking. Math is a powerful language that can be used to challenge the preconceptions of the world and persuade others.


Zoom Link
Course Info
Office Hrs

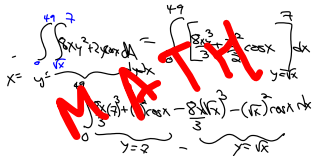

CALCULUS I
MAT 151
REMOTE and ONLINE
Connect Purchase (without eBook)
Connect
Calculus: Early Transcendental Functions
Edition:4
$69.25 USD
SPRING 2022
ANNOUNCEMENTS:
DO NOT PURCHASE COURSE MATERIALS UNTIL CLASS STARTS
This course requires groupwork but no longer an independant research project. You will not be penilized for groupmates that fail to perform.
Syllabus for MAT 151
GROUP DATA SETS:
Apple Stock Value
Salary and BFF's
Grades from Studying
Drug Stability
Weight from Height
World Population
Exam Materials:
Online 151 exam instructions
Formula Sheet
Price of Connect online
Syllabus
Groups for discussions
Exam Instructions
Formula Sheet (may change)

Lecture: Average Rate of Change

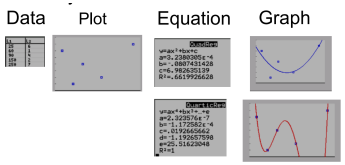
What is Math?
What is Precalculus?
What is Calculus?

What is the Ave Rate of Change?

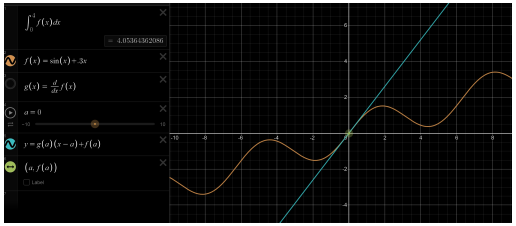
What is math?



What is Precalculus?

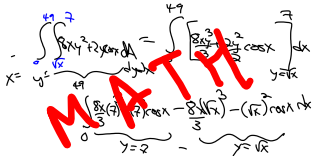


What is Calculus?

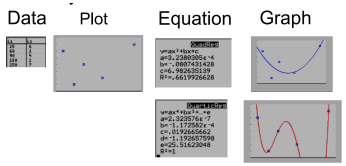


What is math?

Language



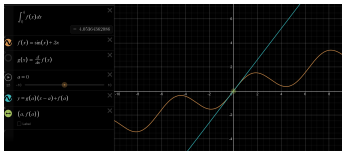
What is Precalculus?



The Study of Functions

What is Calculus?

The Study of Change



Rates:

ratio → a:b

A rate is the ratio between two related quantities in different units.

Express as a fraction

fraction → a/b

The word "per" means divided by,

"Per cent" means divided by 100 → 5% = 5/100

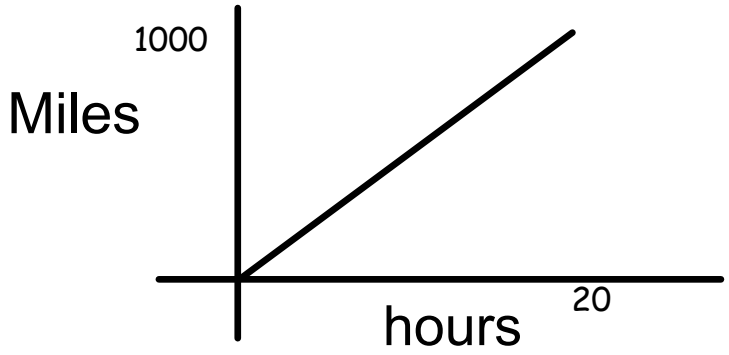
"miles per hour" means miles/hours

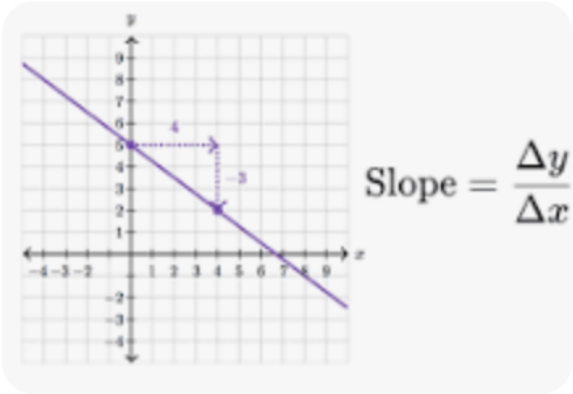
$\frac{60 \text{ miles}}{1 \text{ hour}}$

Slope

steepness

The slope of a line is a measure of its steepness. Mathematically, slope is calculated as "**rise over run**" (change in y divided by change in x).





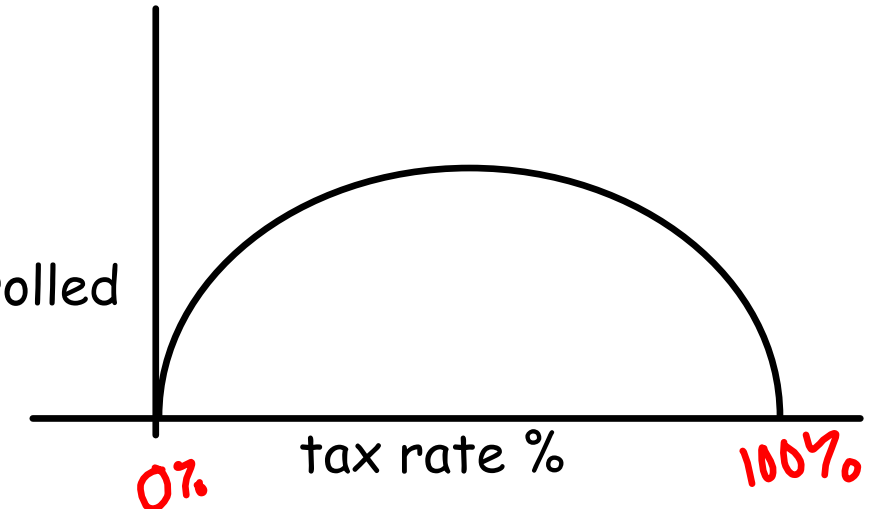
slope =1000mi/20hrs

=50mph

revenue

dependant variable

-the one that is controlled



independant variable

-the one you can control

The slope between

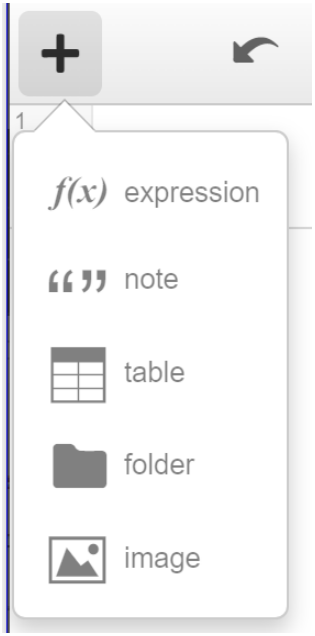
0% and 100% tax rate is

zero.

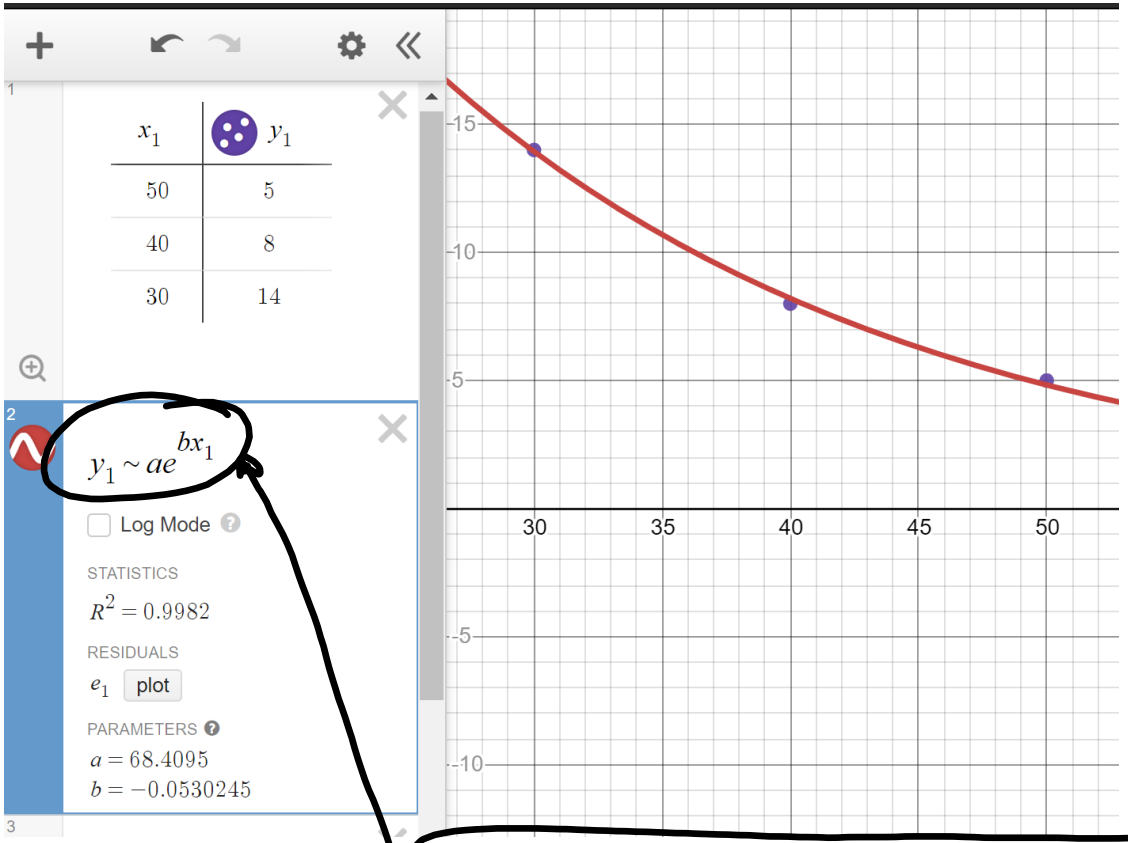
Desmos.com

Price Sales

$	#
50	5
40	8
30	14



Maybe an exponential function?

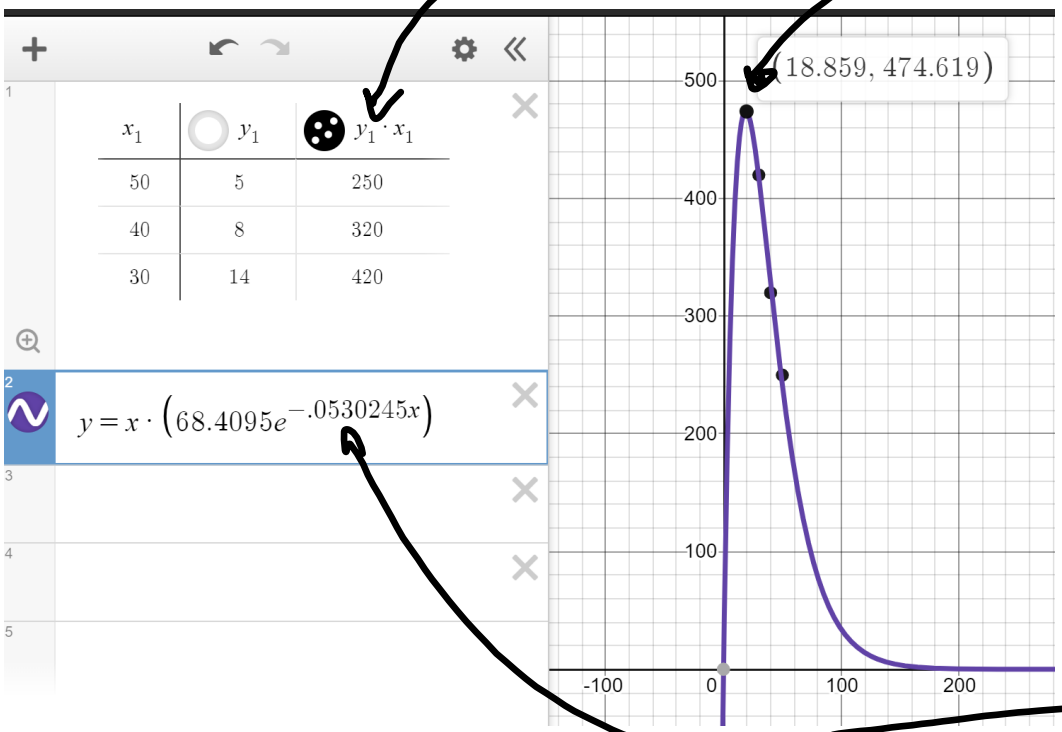


Input for exponential regression

Maximum Revenue

Revenue is Price(X) Time sales y

Charging $18.859 will yield max. revenue of $474.62



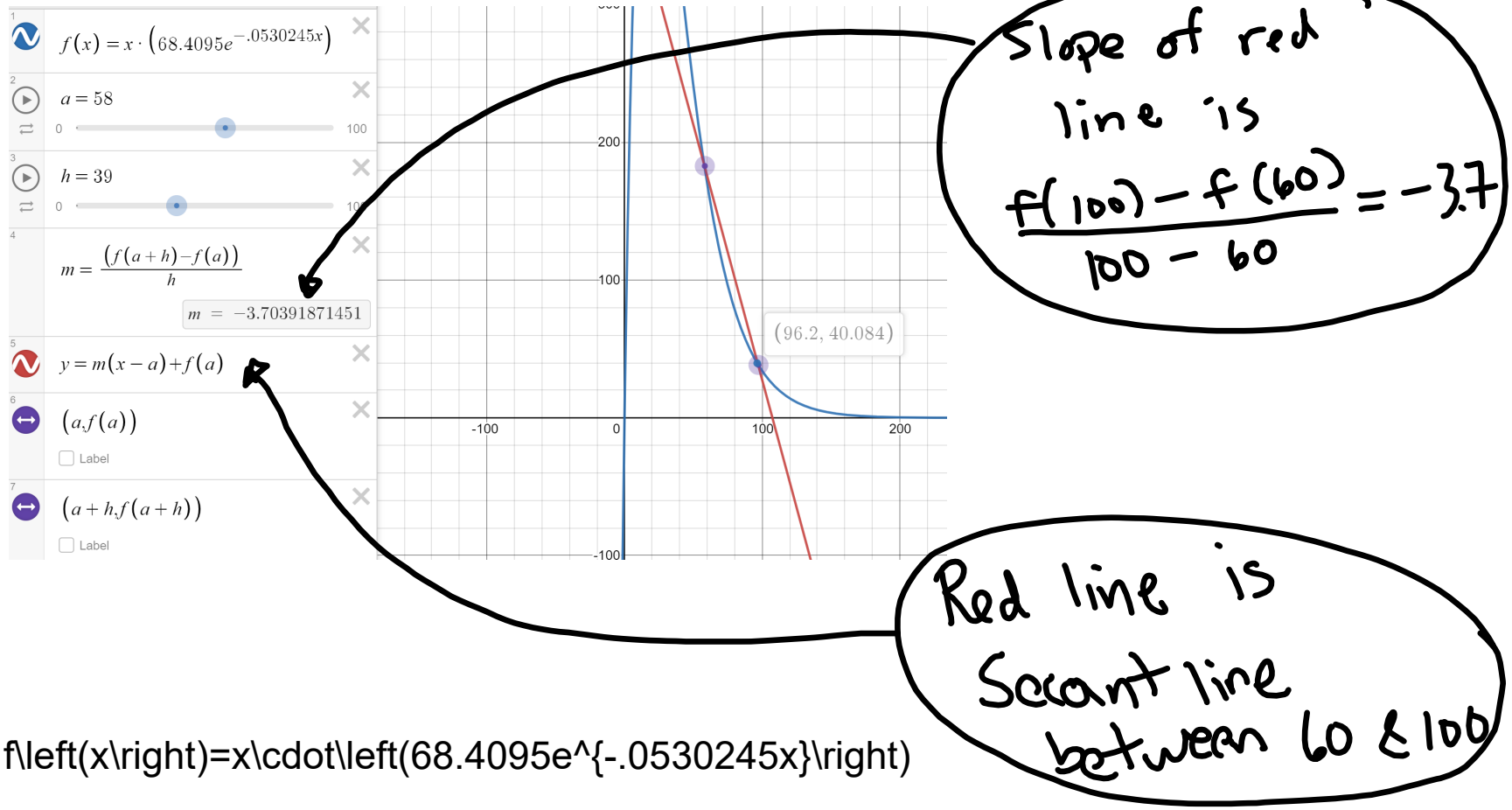
Exponential Regression

Average Rate of Change (ARC)

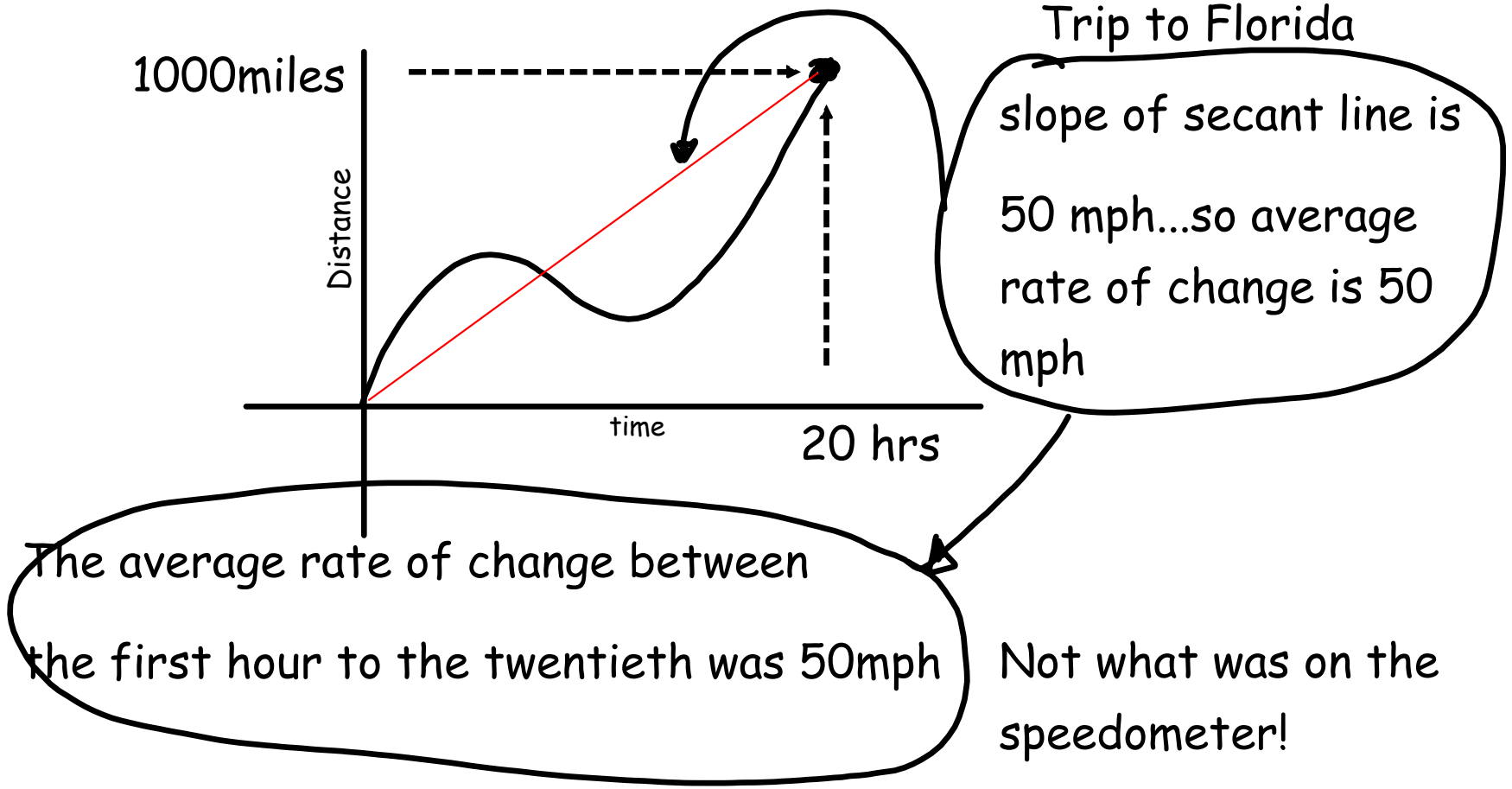
Average Rate of Change is the slope of the secant line

or line segment between two points on a graph.

Requires two points



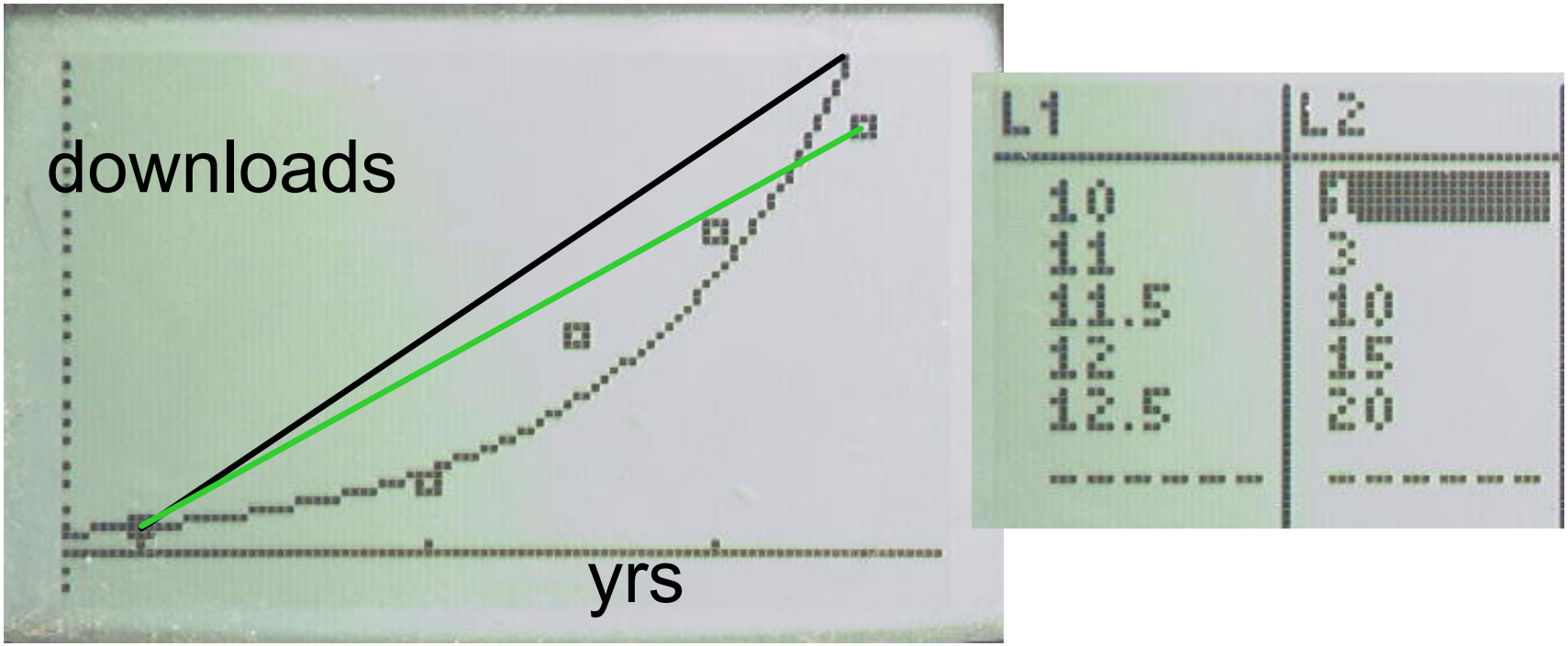
f\left(x\right)=x\cdot\left(68.4095e^{-.0530245x}\right)


Trip to Florida
1000miles
Distance
time
20 hrs
slope of secant line is
50 mph...so average rate of change is 50 mph
The average rate of change between
the first hour to the twentieth was 50mph
Not what was on the speedometer!

Two possibilities for ARC in real life:

1. use beginning and ending data point

2. use beginning and ending points from regression function or graph



ARC from data is slope of green line

ARC from function is slope of black line

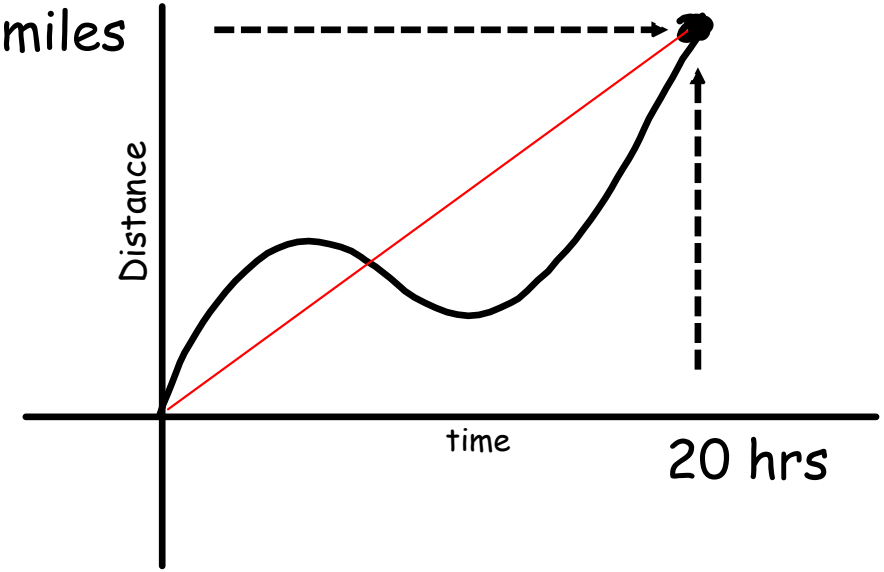
Average Rate of Change:

slope of two points

Instantaneous Rate of Change:

slope at one point???

Remember.....

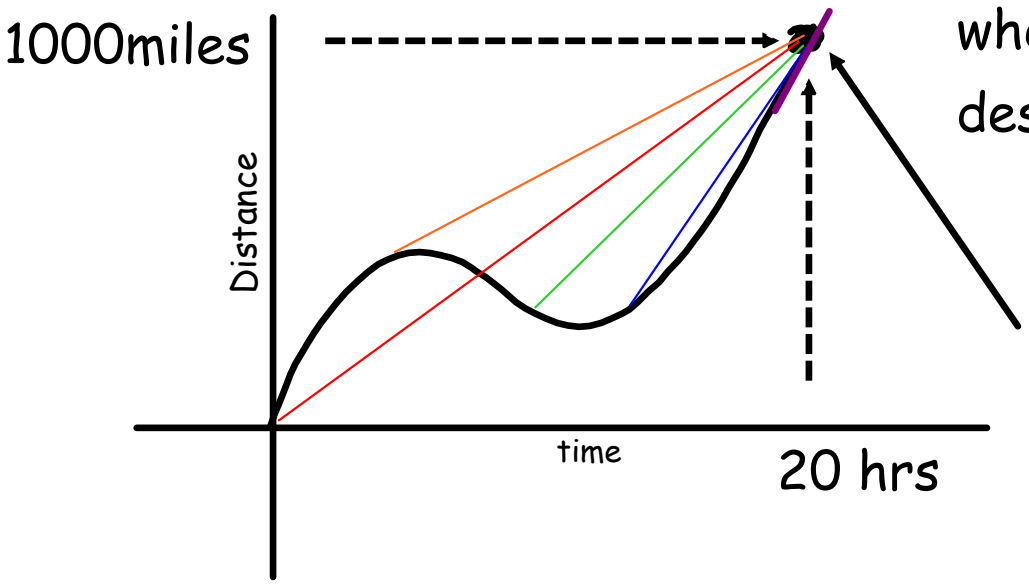


The average rate of change between

the first hour to the twentieth was 50mph

But there is a reading on your speedometer at any one instance. How could we find it?

What if we take the average rate of change closer and closer together?



How fast was I travelling when pulling into my destination?

Look at different colored lines, the Blue and purple lines have the steepest slope, and is closer to the actual speed at 20 hours.

If we take the slope of two points infinitely close to each other, we should get the speedometer speed or the instantaneous rate of change.

Limits

a limit is the value that a function f(x) approaches as the input 'x'approaches some value 'a.'

slope of the secant line (m_{sec}) between 'a' and 'a+h' is

$$m_{sec} = \frac{f(a+h)-f(a)}{a+h-a} = \frac{f(a+h)-f(a)}{h}$$

We use limits to find the instantaneous rate of change, you'll want your input 'h' value to go to zero. That means we will be dividing by zero, which won't be a problem here

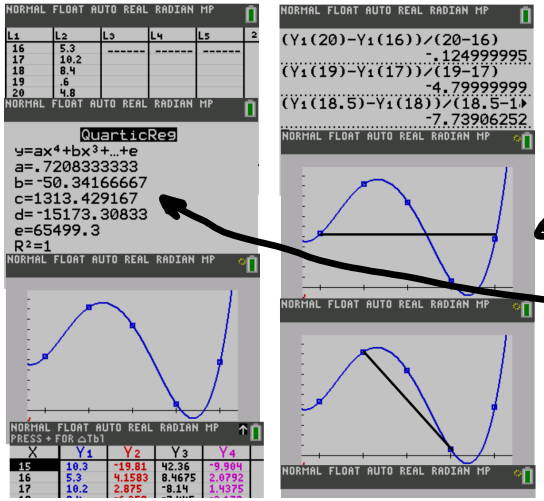
Group Work

Average Rate of Change

GROUP DATA SETS:

Apple Stock Value	Salary and BFF's	Grades from Studying	Drug Stability	Weight from Height	World Population	

Year after 2000, Value of Apple Stock in Billions



Ave Rate of Change

Secant line

Quartic Regression

Groups:

Three or more people of the same major

Will use the same data all semester

It can be your own, will need 5 data points.

JOBS:

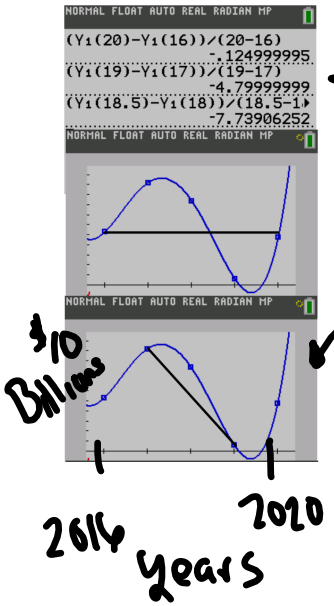
Producer creates pictures and graphs

Writer describes situation mathematically

Speaker describes situation in words that could be spoken by a computer

ALL posted on Blackboard for credit

Producer



Writer

```
(Y1(19)-Y1(17))/(19-17)
                -4.79999999
```

$ billions / yr.

Speaker:

According to the quartic regression, the average rate of change in Apple stock between 2016 and 2020 was a drop of 4.8 billion dollars per year.

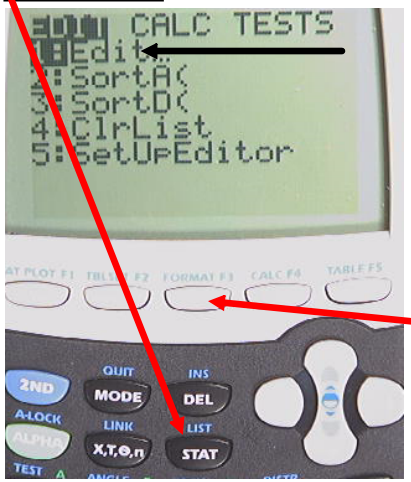
Calculator or DESMOS

NOTE: Only allowed to use the free version of DESMOS on exams - no calculator, no login

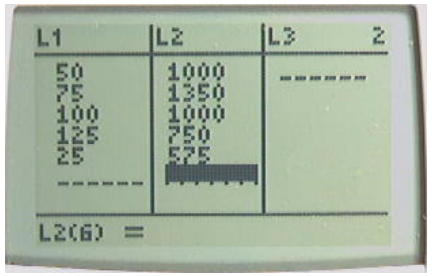
www.desmos.com/calculator

TO PLOT DATA

stat

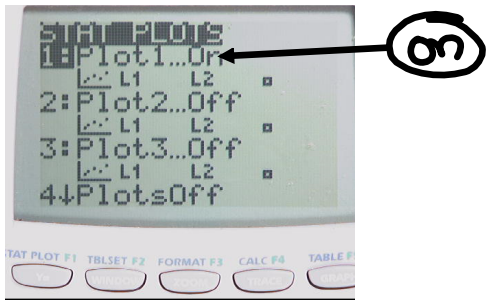


input data

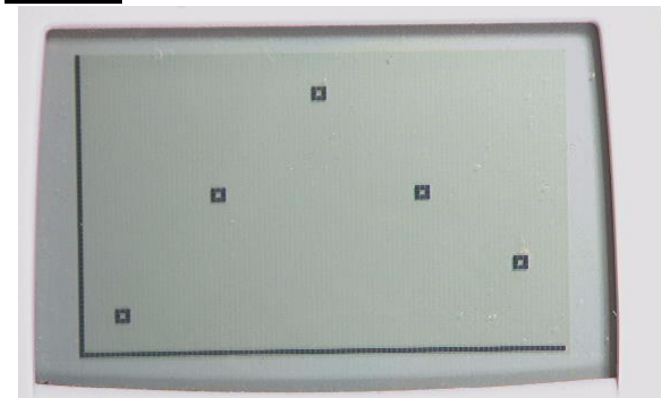


2nd y=

Enter

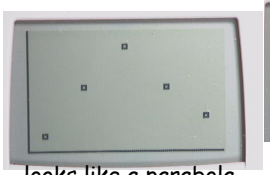


zoom 9



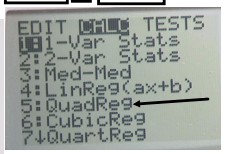
REGRESSION

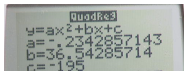
stat > calc



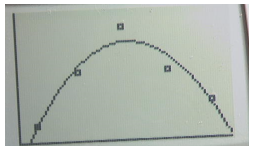
looks like a parabola

(quadratic regression)





y= vars 5 > > 1



graph

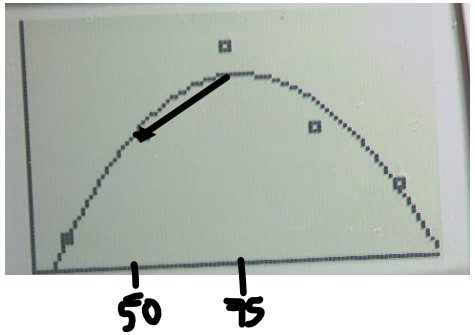
y= vars 5 > > 1

graph

ARC

vars > 1 enter → y1

y1(75)=1227....



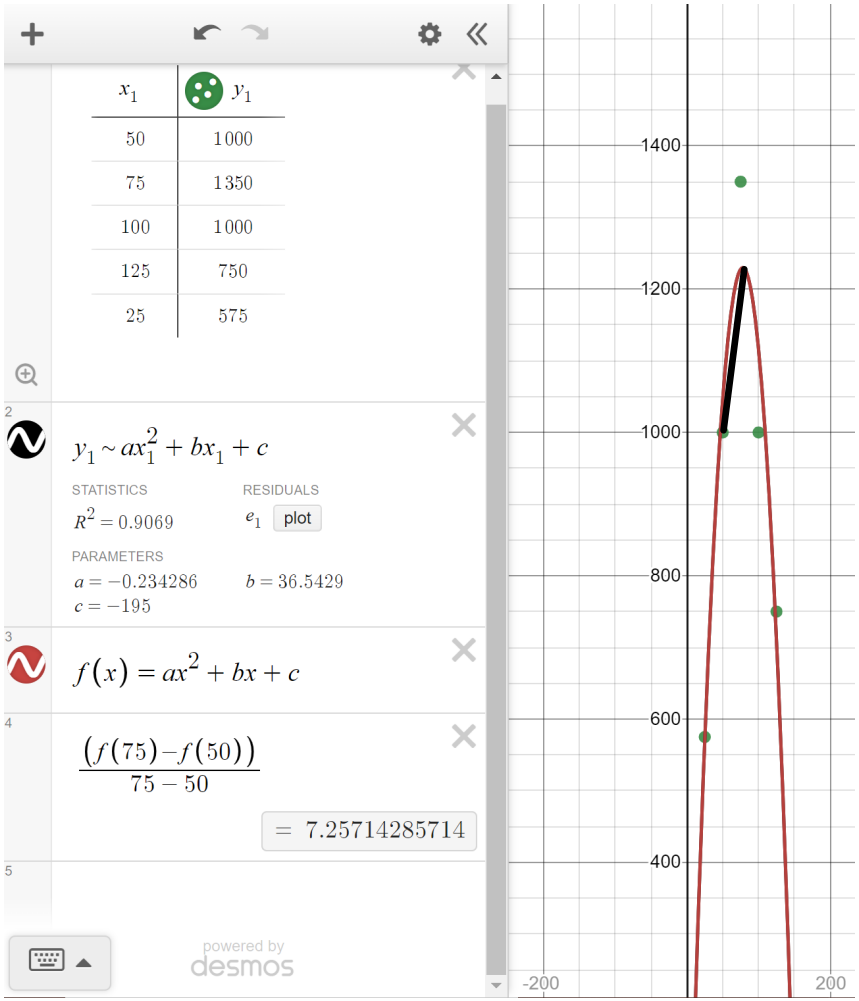
$$\frac{Y_1(75)-Y_1(50)}{75-50} =$$

Y1(75)-Y1(50)
181.4285714
Ans/25
7.257142857

7.25 Profit per $

According to the quadratic regression of the data given, between $50 and $75 dollars charged, the average rate of change is 7.25 dollars per dollar charged.

Desmos


x_1 y_1
50 1000
75 1350
100 1000
125 750
25 575
$y_1 \sim ax_1^2 + bx_1 + c$
STATISTICS
$R^2 = 0.9069$
RESIDUALS
e_1 plot
PARAMETERS
$a = -0.234286$
$b = 36.5429$
$c = -195$
$f(x) = ax^2 + bx + c$
$\frac{(f(75) - f(50))}{75 - 50}$
$= 7.25714285714$
powered by desmos
1400
1200
1000
800
600
400
-200
200

Reminders....

1. Go to Blackboard
2. Post your Selfie on Discussion Forum
3. Set up Connect by opening an assignment