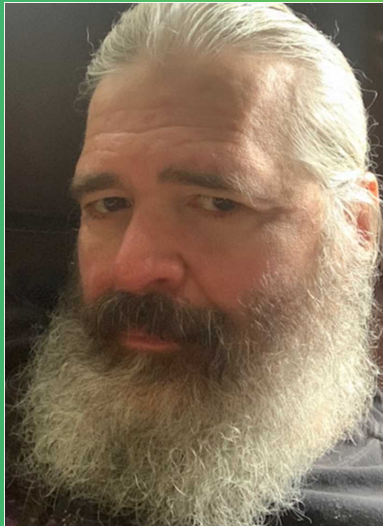


MAT 151 Calculus 1

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 title because I'm so special, but because people who call me "Mister" want 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 important but can wait a few days, send it by email to porterr@mccc.edu. I won't usually reply unless you ask a question, so be sure to include a question mark. If it's more urgent, text me at 609-616-2841. Also, feel free to take pictures of math problems, be sure to send your work too. I usually respond in a day or sooner. If you are having a time critical problem, like you cannot open your Honorlock® exam, don't wait for a text response. Call me on my phone. If I don't answer, please leave a message and include when I can call you back.

My office hours are Tuesday, Wednesday, and Thursday in the evening via 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%	93%-100%.....A
Homework	10%	90%-92%.....A-
Quizzes	10%	87%-89%.....B+
Tests (2)	5%	83%-86%.....B
Midterm	30%	80%-83%.....B-
Final*	40%	77%-79%.....C+
Total	100%	70%-76%.....C
		60%-69.5%.....D
		<59.5%.....F

*Must Receive a 50% on Final to pass course

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

¹Practice 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).
²All workpaper must be ordered, questions clearly labeled, all work shown for every problem, and calculator steps outlined.
³Up to a week after the exam, student must explain why credit is requested for each individual question. Workpaper and Honorlock® recordings may be referenced.
⁴Workpaper will be automatically reviewed. Honorlock® recordings must be referenced to be considered.

Software only required

Final & Midterm 70% of grade

Graded Homework

Repeatable to Due Date

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			

Actual Due Date

Final Draft Accepted

Make sure you can do these dates



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

Midterm + Final Only

Make sure you know Honorlock

LESSONS

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.

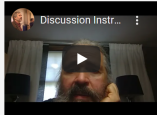
Weekly Discussion Instructions and links: Everyone: The discussion format has changed since some of the videos have been made, so refer only to the video below.

To start, you should look over the topics below and decide which interests you the most.

Apple Stock Value	Salary and RFP's	Grades from Statistics	Dow Stability	Wages 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 receive credit.

See the video link below for instructions for details:

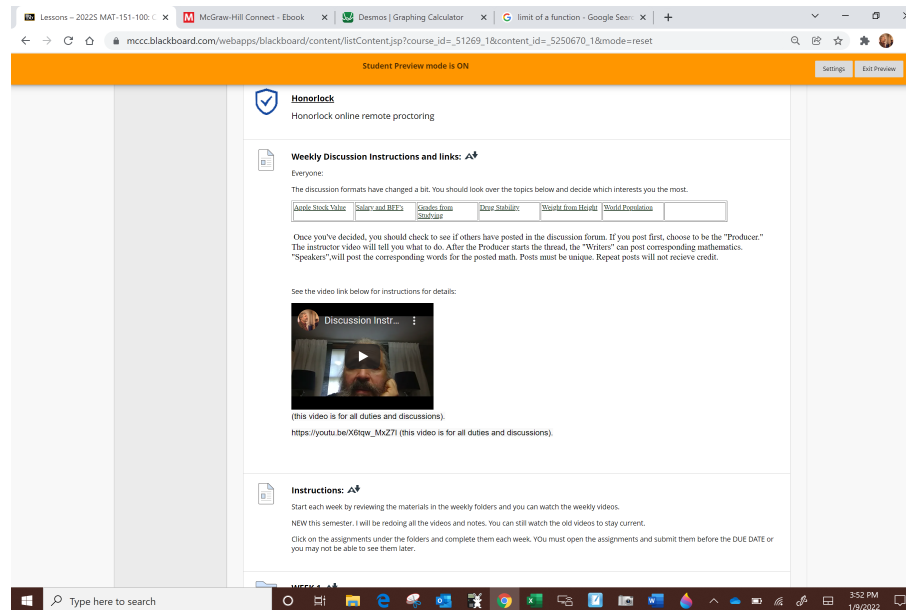


(this video is for all duties and discussions).
https://youtu.be/X8lqw_MxZ7I (this video is for all duties and discussions).
I look forward to seeing how you present your mathematics.
Prof Porter

New Videos + Notes

Discussion Topics

Instruction Video



The screenshot shows a Blackboard course page with the following content:

- Course title: Lessons - 20225 MAT-151-100
- Navigation: Home, My Courses, My Recent Activity, My Assignments, My Grades, My Profile, My Settings, My Notifications, My Alerts, My Account, My Help, My Support, My Feedback, My Privacy, My Security, My Accessibility, My Language, My Time Zone, My Location, My IP Address, My Browser, My Operating System, My Device, My Network, My Internet Service Provider, My ISP, My DNS, My DNS Server, My DNS Record, My DNS Record Type, My DNS Record Value, My DNS Record TTL, My DNS Record Expiration Date, My DNS Record Creation Date, My DNS Record Last Updated Date, My DNS Record Status, My DNS Record Zone, My DNS Record Parent Zone, My DNS Record Child Zone, My DNS Record Ancestor Zone, My DNS Record Descendant Zone, My DNS Record Sibling Zone, My DNS Record Nephew Zone, My DNS Record Niece Zone, My DNS Record Uncle Zone, My DNS Record Aunt Zone, My DNS Record Grandfather Zone, My DNS Record Grandmother Zone, My DNS Record Grandson Zone, My DNS Record Granddaughter Zone, My DNS Record Great-Grandfather Zone, My DNS Record Great-Grandmother Zone, My DNS Record Great-Grandson Zone, My DNS Record Great-Granddaughter Zone, My DNS Record Great-Great-Grandfather Zone, My DNS Record Great-Great-Grandmother Zone, My DNS Record Great-Great-Grandson Zone, My DNS Record Great-Great-Granddaughter Zone, My DNS Record Great-Great-Great-Grandfather Zone, My DNS Record Great-Great-Great-Grandmother Zone, My DNS Record Great-Great-Great-Grandson Zone, My DNS Record Great-Great-Great-Granddaughter Zone.
- Student Preview mode is ON
- Honorlock: Honorlock online remote proctoring
- Weekly Discussion Instructions and links: Everyone: The discussion formats have changed a bit. You should look over the topics below and decide which interests you the most. (Includes the same table of topics as the first image)
- Once you've decided, you should check to see if others have posted in the discussion forum. If you post first, choose to be the "Producer." The instructor video will tell you 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. Repeat posts will not receive credit.
- See the video link below for instructions for details: (Includes the same video link and thumbnail as the first image)
- 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. 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.

LESSONS

WEEK 1 ▲

Watch video 2 (ignor ALEKS) <https://youtu.be/P6Sll7Ytj4g>
Watch video 3 Spring (ignor ALEKS) <https://youtu.be/R6pYqZe9op4>

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/XXkx5eQHGT0>
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

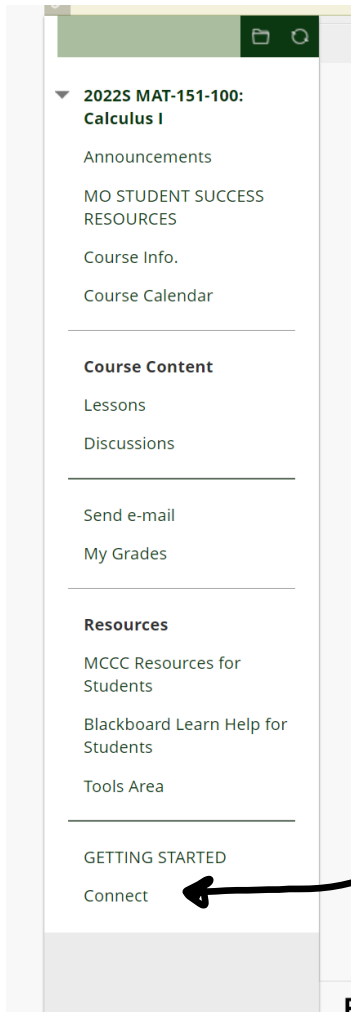
Homework 2* Derivatives

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



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 & Grudgebook

DISCUSSIONS

Discussion Board

The main discussion board page appears with a list of available discussion forums. Forums are made up of individual discussion threads that can be organized around a particular subject. A thread is a conversation within a forum that includes the original post and all replies to it. When you access a forum, a list of threads appears. [More Help](#)

FORUM	DESCRIPTION	TOTAL POSTS	UNREAD POSTS	UNREAD REPLIES TO ME	TOTAL PARTICIPANTS
Personal Introductions	Hi! This is your place to introduce yourself. Please attach a photo or gif of yourself along with your major, any of your interests, and why you are taking this class.	4	4	0	4
Ave Rates of change	Present an argument for the average rate of change. Be sure to specify the regression used, the endpoints, and the units. https://youtu.be/_5tz2w6fnCk	1	1	0	1
Limits	Argue limits at a point of interest, and at the ends. Don't forget the regression. How to do the "limits" discussion https://youtu.be/Wnft-00919k	1	1	0	1
Derivatives of Polynomials	Give the instantaneous rates of change. Be sure to mention the regression, the point of interest, and the units. How to do derivatives of Polynomials https://youtu.be/TtrZECmbxMk	1	1	0	1

Repeat week 4, only use a ln, exponential, or sine regression.

Discussion Link

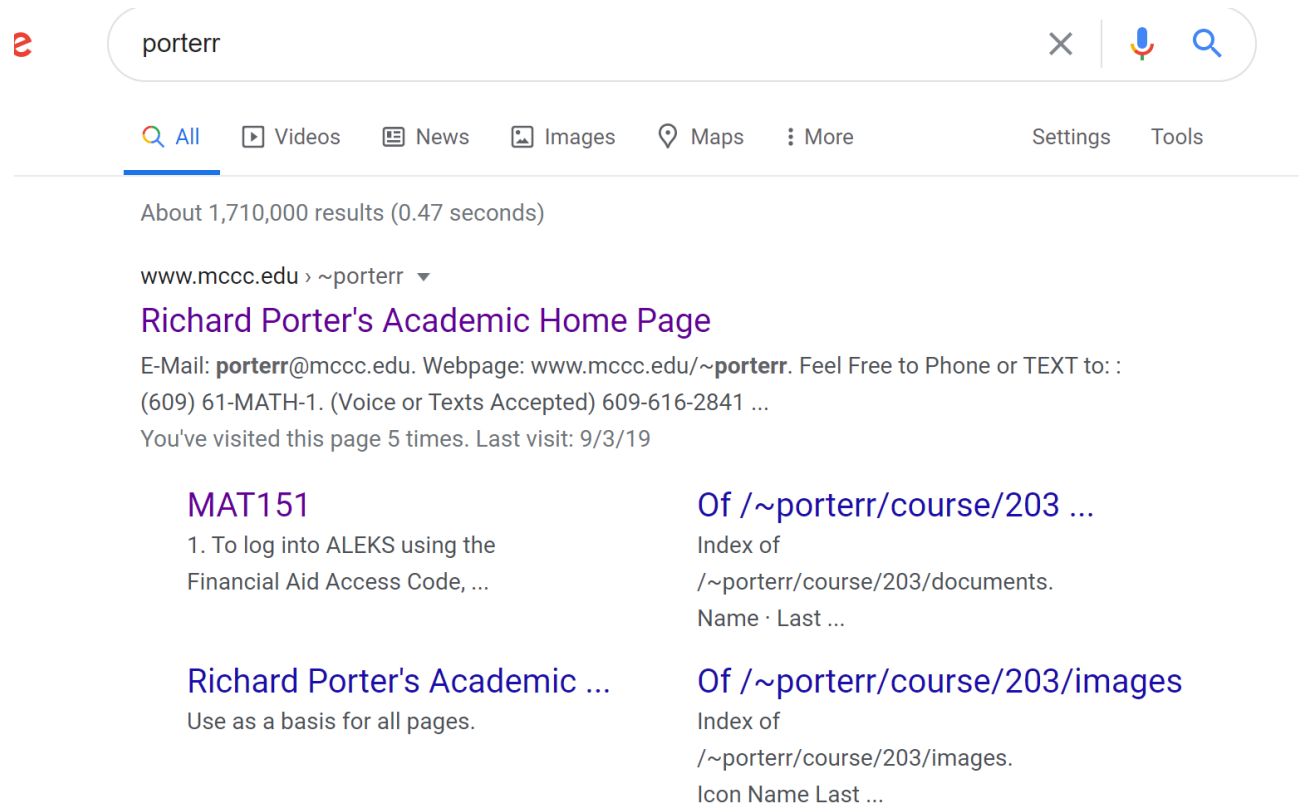
Weekly Topics

Click to open

Watch video for more info

Not on Connect

If Blackboard is down...google my webpage



The image shows a Google search interface. The search bar contains the text "porterr". Below the search bar, there are navigation options: "All", "Videos", "News", "Images", "Maps", and "More". To the right of these options are "Settings" and "Tools". The search results show "About 1,710,000 results (0.47 seconds)". The first result is for "www.mccc.edu > ~porterr" with a dropdown arrow. The title is "Richard Porter's Academic Home Page". The description includes: "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 ... You've visited this page 5 times. Last visit: 9/3/19". Below this are two columns of search results. The left column has a link "MAT151" with a description: "1. To log into ALEKS using the Financial Aid Access Code, ...". The right column has a link "Of /~porterr/course/203 ..." with a description: "Index of /~porterr/course/203/documents. Name · Last ...". Below these are two more links. The left one is "Richard Porter's Academic ..." with a description: "Use as a basis for all pages.". The right one is "Of /~porterr/course/203/images" with a description: "Index of /~porterr/course/203/images. Icon Name Last ...".

porterr

All Videos News Images Maps More Settings Tools

About 1,710,000 results (0.47 seconds)

www.mccc.edu > ~porterr ▾

Richard Porter's Academic Home Page

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 ...

You've visited this page 5 times. Last visit: 9/3/19

MAT151

1. To log into ALEKS using the Financial Aid Access Code, ...

Richard Porter's Academic ...

Use as a basis for all pages.

Of /~porterr/course/203 ...

Index of /~porterr/course/203/documents. Name · Last ...

Of /~porterr/course/203/images

Index of /~porterr/course/203/images. Icon Name Last ...

PROFESSOR RICHARD PORTER
HOME PAGE FOR SPRING 2022

MERCER COUNTY COMMUNITY COLLEGE
TRENTON, NEW JERSEY

ZOOM Meeting Access
4481133965

Office Hrs Schedule

Quick Links

PRECALCULUS MAT 146

CALCULUS II MAT 151

ALL SECTIONS

PRECALCULUS

MAT146 USING ALEKS

MAT151

USING Connect®

ZOOM Meeting Access
4481133965

Feel Free to Phone or TEXT to :
(609) 61-MATH-1
(Voice or Texts Accepted) **609-616-2841**

Office:
E-Mail: porter@mcce.edu
Webpage: www.mcce.edu/~porter







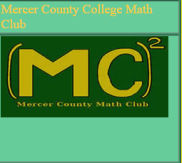



History of Math Video

Mercer County College Math Club

Teaching is all about learning from example. I will do my best to learn and adapt to the everchanging world. I hope others will join me.

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.

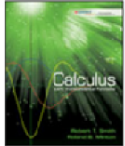











Zoom Link

Course Info

Office Hrs

**CALCULUS I
MAT 151**
REMOTE and ONLINE



Connect Purchase (without ebook)
Connect
Calculus: Early Transcendental Functions
Edition: 4
Author: Robert Strogatz, Roland Winton
\$69.25 USD

SPRING 2022

ANNOUNCEMENTS:

DO NOT PURCHASE COURSE MATERIALS UNTIL CLASS STARTS
This course requires groupwork but no longer an independent research project. You will not be penalized 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

Formula Sheet (may change)

Exam Instructions

Lecture: Average Rate of Change

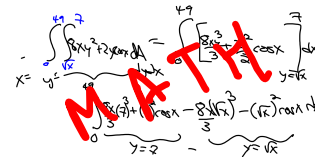
What is Math?

What is Precalculus?

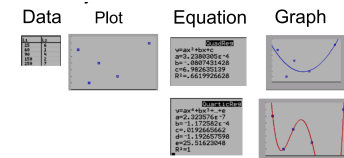
What is Calculus?

What is the Ave Rate of Change?

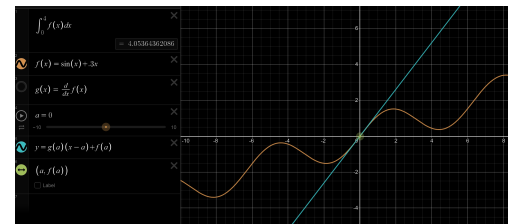
What is math?



What is Precalculus?



What is Calculus?

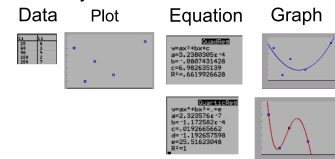


What is math?

Language

Handwritten mathematical formulas including $\int_{a}^{b} f(x) dx$, $\frac{d}{dx} \sin x = \cos x$, and $\frac{d}{dx} \cos x = -\sin x$. The word "MATH" is written in large, bold, red letters across the center of the formulas.

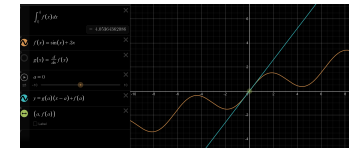
What is Precalculus?



The Study of Functions

What is Calculus?

The Study of Change



Rates:

ratio $\rightarrow a:b$

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

Express as a fraction

fraction $\rightarrow a/b$

The word "per" means divided by,

"Per cent" means divided by 100

$5\% = \frac{5}{100}$

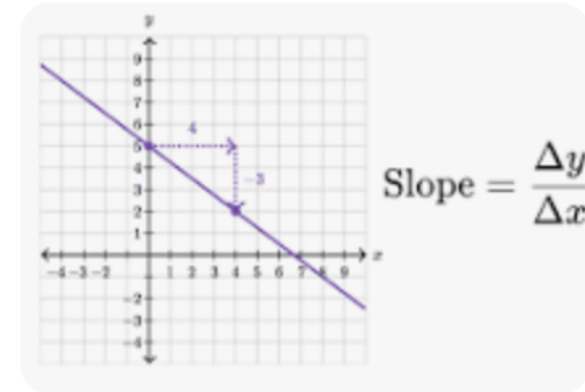
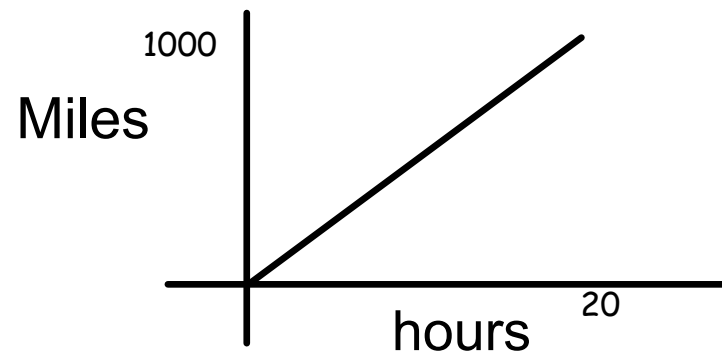
"miles per hour" means miles/hours

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

Slope

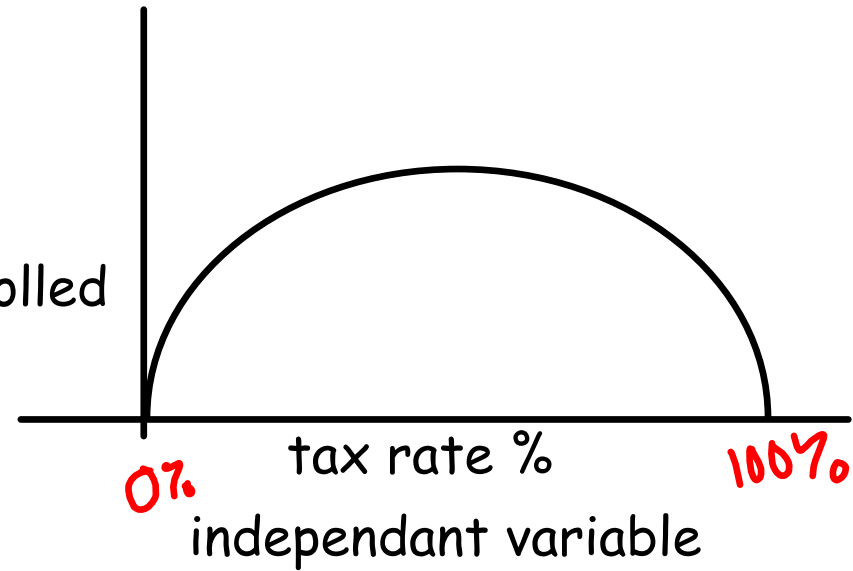
steepness

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).



$$\begin{aligned}\text{slope} &= 1000\text{mi}/20\text{hrs} \\ &= 50\text{mph}\end{aligned}$$

revenue
dependant variable
-the one that is controlled

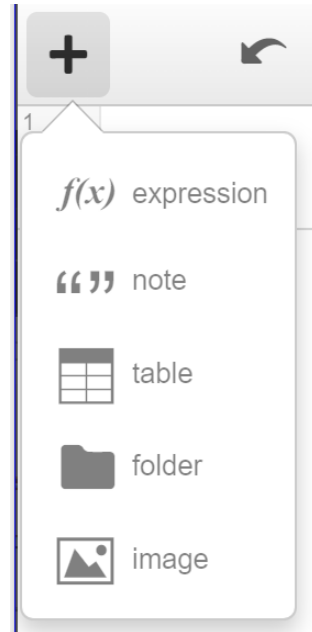


The slope between
0% and 100% tax rate is
zero.

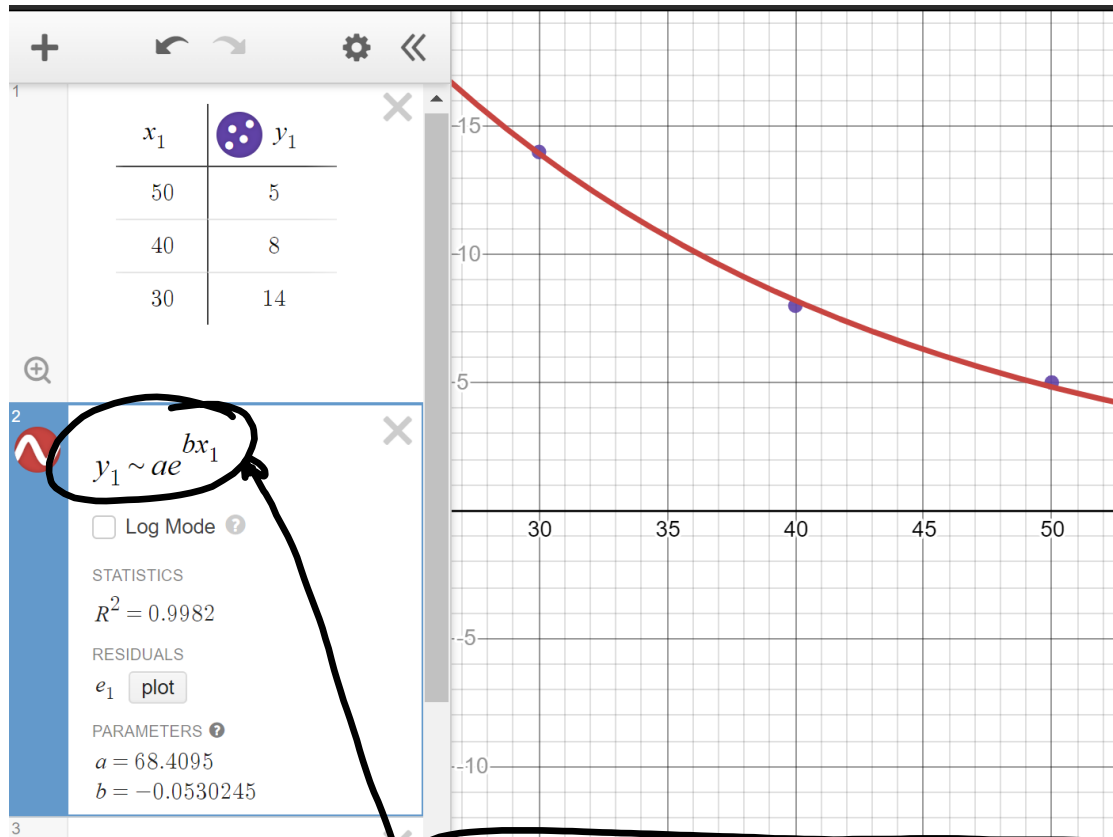
Price Sales

\$	#
50	5
40	8
30	14

Desmos.com



Maybe an exponential function?

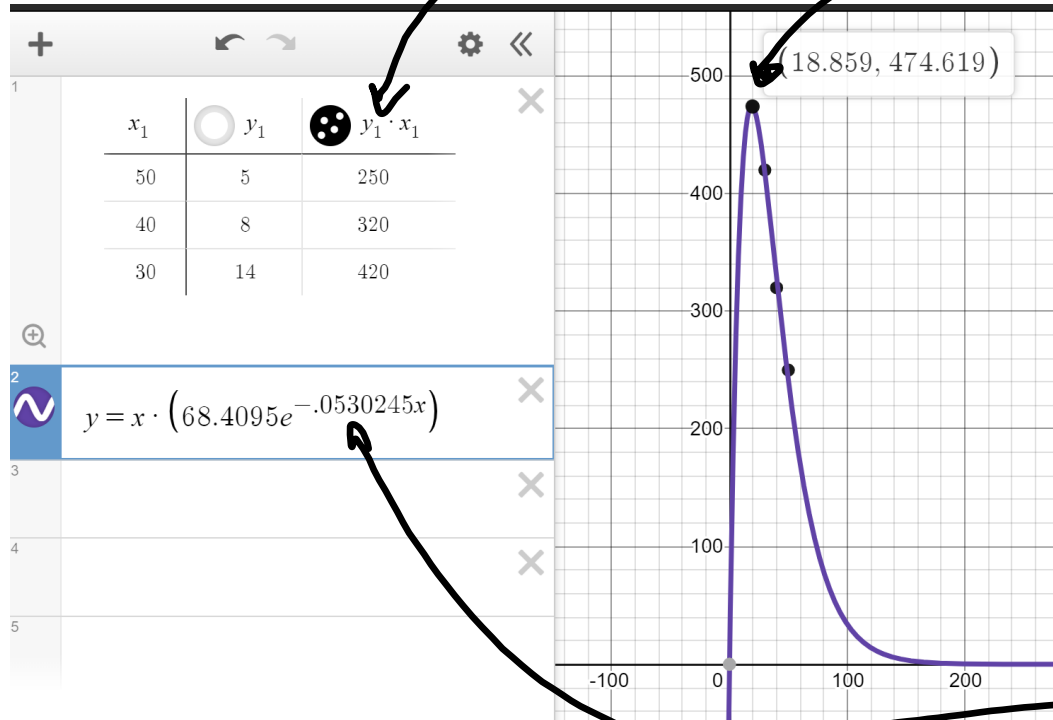


Input for exponential regression

Maximum Revenue

Revenue is Price(x) Time Sales y

Charging by \$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

1 $f(x) = x \cdot (68.4095e^{-.0530245x})$

2 $a = 58$

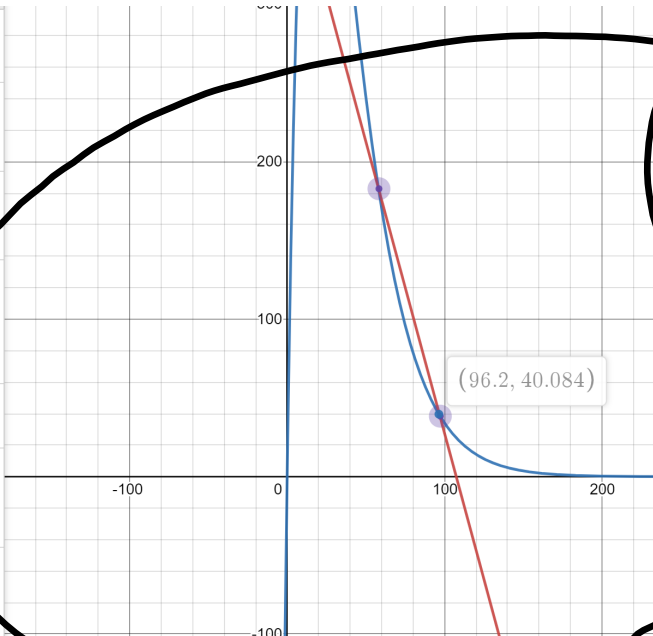
3 $h = 39$

4 $m = \frac{f(a+h) - f(a)}{h}$
 $m = -3.70391871451$

5 $y = m(x - a) + f(a)$

6 $(a, f(a))$

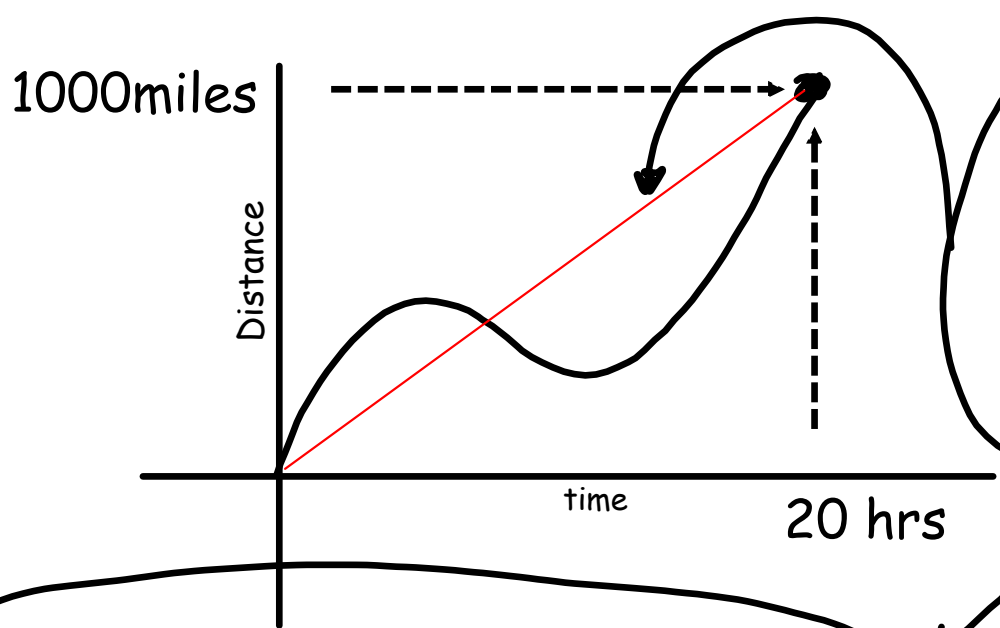
7 $(a + h, f(a + h))$



Slope of red line is $\frac{f(100) - f(60)}{100 - 60} = -3.7$

Red line is Secant line between 60 & 100

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



Trip to Florida

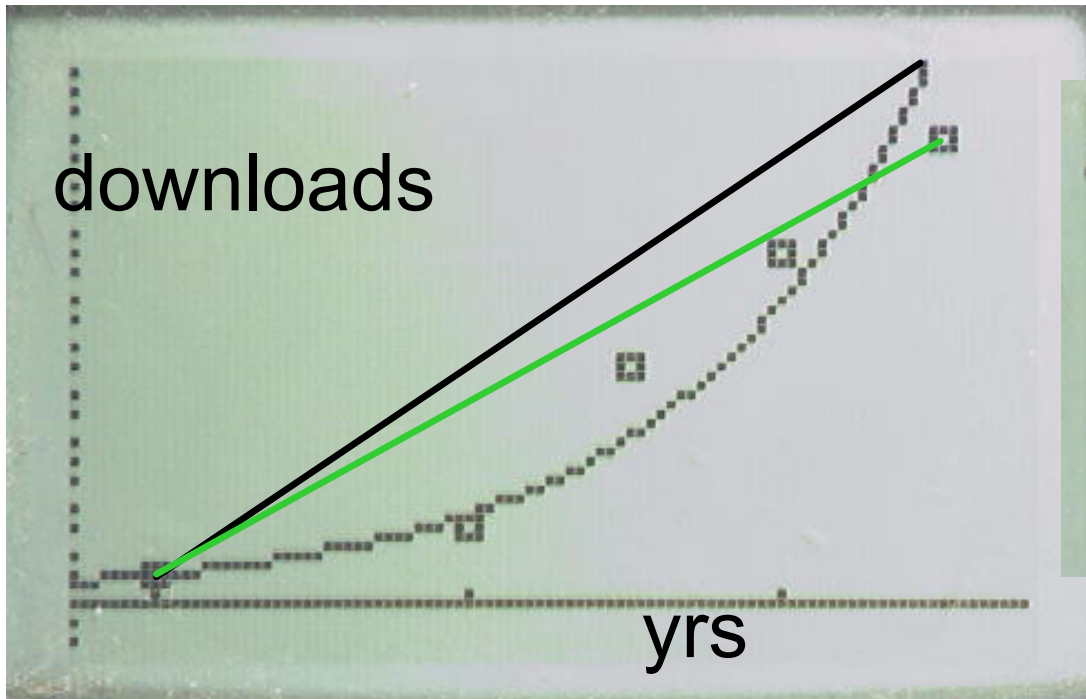
slope of secant line is
50 mph...so average
rate of change is 50
mph

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



L1	L2
10	7
11	8
11.5	10
12	15
12.5	20

ARC from data is slope of green line

ARC from function is slope of black line

Average Rate of Change:

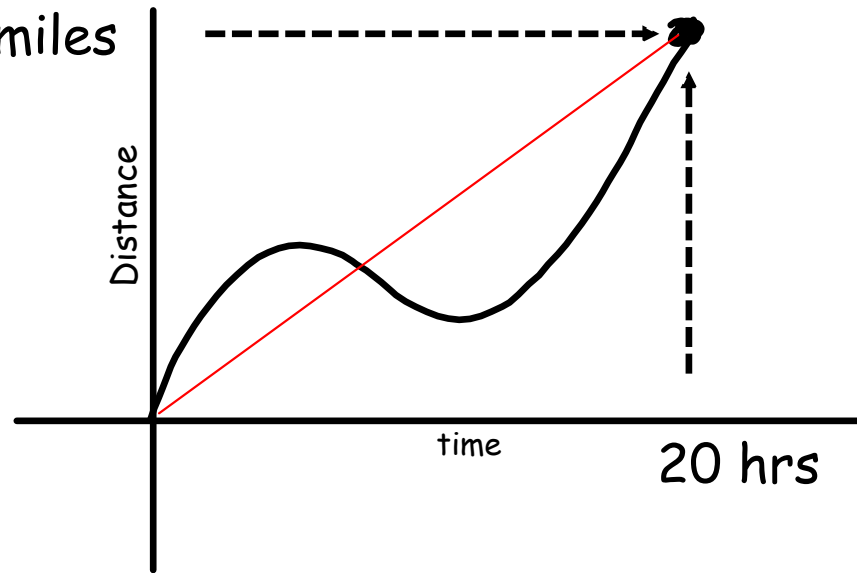
slope of two points

Instantaneous Rate of Change:

slope at one point???

Remember.....

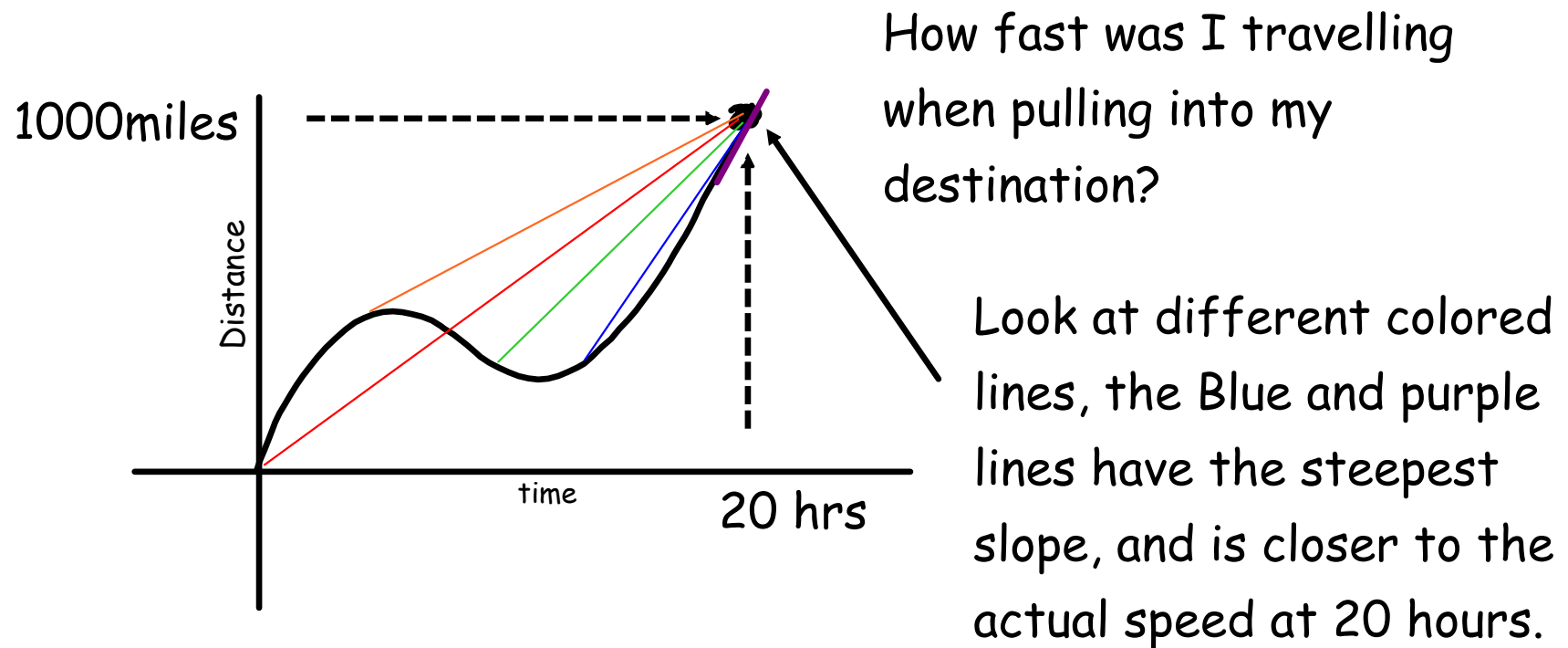
1000miles



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?



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

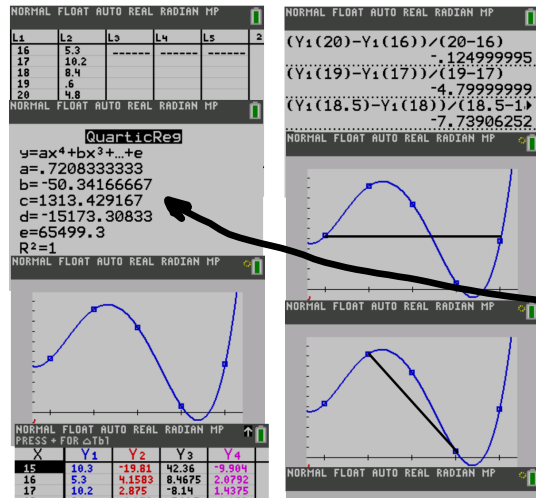
Group Work

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.

JOB:

Producer creates pictures and graphs

Writer describes situation mathematically

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

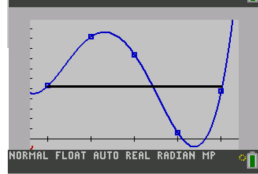
ALL posted on Blackboard for credit

Producer

```

NORMAL FLOAT AUTO REAL RADIAN MP
(Y1(20)-Y1(16))/(20-16)
-1.24999995
(Y1(19)-Y1(17))/(19-17)
-4.79999999
(Y1(18.5)-Y1(18))/(18.5-18)
-7.73906252

```



\$10
Billions

2016 2020
years

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.

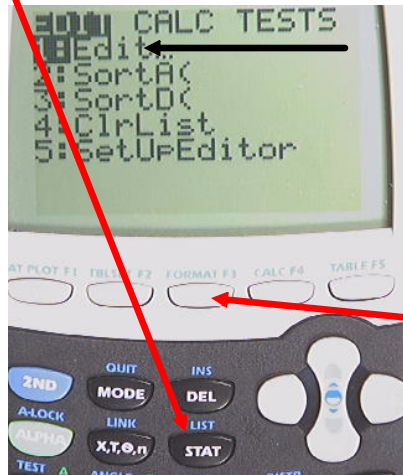
Calculator or DESMOS

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

www.desmos.com/calculator

TO PLOT DATA

stat



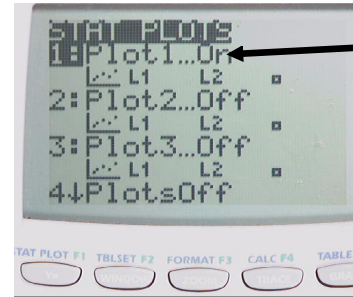
input data

L1	L2	L3	2
50	1000		
75	1350		
100	1000		
125	750		
25	525		

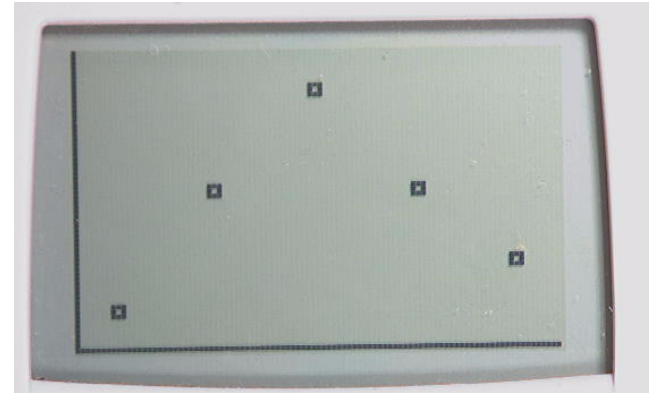
L2(G) =

2nd **y=**

Enter

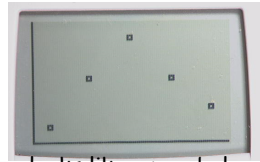


zoom **9**



REGRESSION

stat > calc



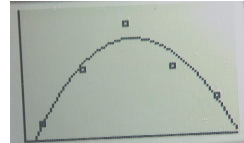
looks like a parabola

(quadratic regression)

```
EDIT TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7:QuartReg
```

```
QuadReg
y=ax2+bx+c
a=-.2342857143
b=36.54285714
c=-195
```

y=vars 5 >> 1 Graph



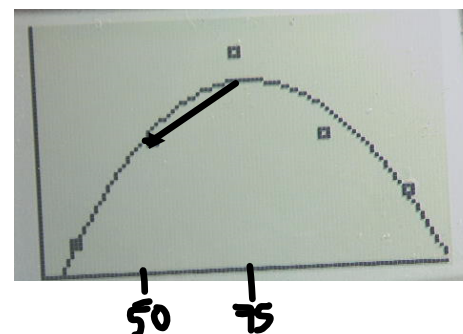
y= vars 5 >> 1

graph

ARC

`vars` `>` `1` `enter` \rightarrow y_1

$y_1(75) = 1227 \dots$



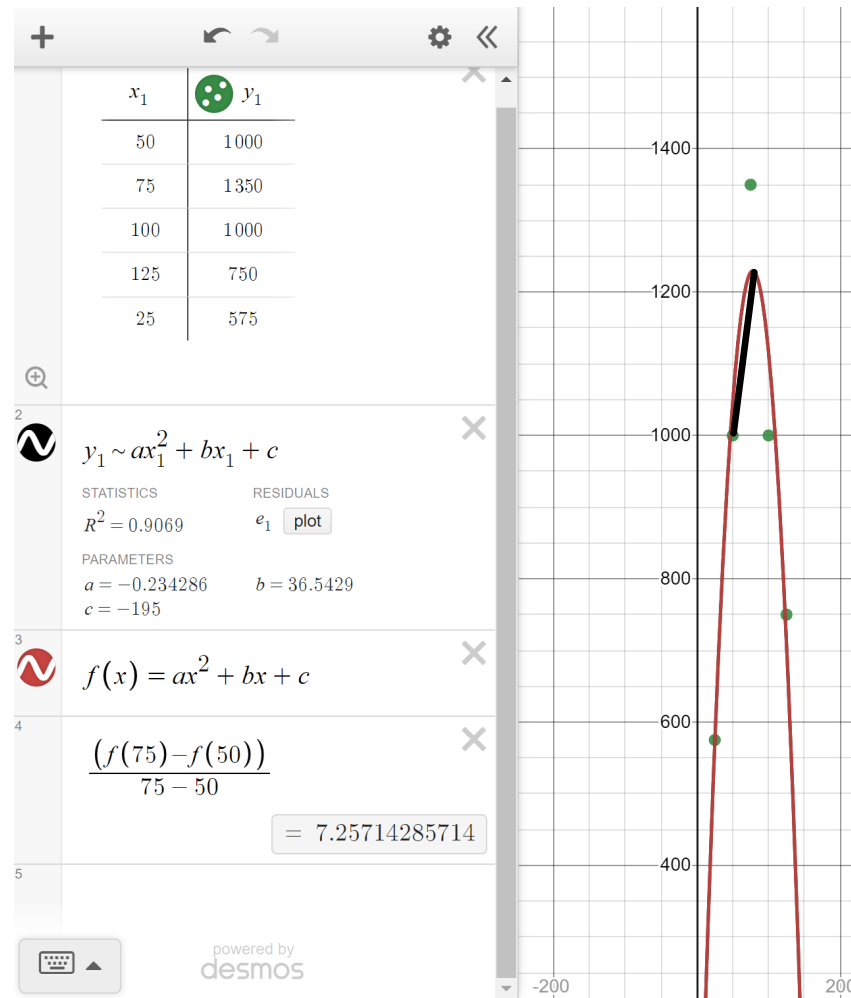
$$\frac{Y_1(75) - Y_1(50)}{75 - 50} =$$

```
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



Reminders....

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

