

## My Schedule

<u>Monday (odd)</u>	<u>Tuesday (even)</u>	<u>Wednesday</u>	<u>Thursday (odd)</u>	<u>Friday (even)</u>
1 <sup>st</sup> —PAPAAT 8:00-9:25	2 <sup>nd</sup> —AP Calc AB 8:20-9:40	1 <sup>st</sup> —PAPAAT 8:05-8:53	1 <sup>st</sup> —PAPAAT 8:00-9:25	2 <sup>nd</sup> —AP Calc AB 8:20-9:40
3 <sup>rd</sup> —AP Stats 9:30-10:55	Helix 9:45-10:15	2 <sup>nd</sup> —AP Calc AB 8:58-9:45	3 <sup>rd</sup> —AP Stats 9:30-10:55	Helix 9:45-10:15
Lunch	SOAR 10:15-11:05	3 <sup>rd</sup> —AP Stats 9:50-10:37	Lunch	SOAR 10:15-11:05
5 <sup>th</sup> —AP Calc BC 11:35-1:00	Lunch 11:10-11:40	4 <sup>th</sup> —PREP 10:42-11:29	5 <sup>th</sup> —AP Calc BC 11:35-1:00	Lunch 11:10-11:40
7 <sup>th</sup> —PAPAAT 1:05-2:30	4 <sup>th</sup> —(no class) 11:45-1:05	Lunch	7 <sup>th</sup> —PAPAAT 1:05-2:30	4 <sup>th</sup> —(no class) 11:45-1:05
	6 <sup>th</sup> —(no class) 1:10-2:30	5 <sup>th</sup> —AP Calc BC 12:04-12:51		6 <sup>th</sup> —(no class) 1:10-2:30
		6 <sup>th</sup> —PREP 12:56-1:43		
		7 <sup>th</sup> —PAPAAT 1:48-2:35		

The above is the standard daily schedule. On weeks when there is a Monday or Friday with no students (holidays or inservice days) there will be no 'Wednesday all classes' schedule.

**If Holiday falls on a Monday, the Schedule will be:**

Tuesday – Odd / Wednesday – Even / Thursday – Odd / Friday – Even

**If Holiday falls on a Friday, the Schedule will be:**

Monday – Odd / Tuesday – Even / Wednesday – Odd / Thursday – Even

## General HeLa High School Information

The office can be reached by dialing 6340 on the classroom phone

Students are to stay in class. If a student (for example) says they need to see the counselor, they need to have the pass prior to class beginning.

If a discipline issue requires immediate attention, security can be reached by dialing 6348 on the classroom phone (if phone is not answered, dial 6340 and they will contact via walkie talkie)

If you have a non-emergency need and/or question, please see Susie Ridgeway next door (Room 211...her classroom shares the back wall of my classroom)

In case of fire alarm, please take the clear folder located directly to the right of the door and accompany the students to the fields in the back of the building (you won't miss it, the whole school will be going to the same location). The students line up by class. Please take today's attendance sheet and retake attendance for that class while on the field. If all students are accounted for, have a student hold aloft the green placard. If not all students accounted for, have a student hold aloft the red placard until all students are accounted for.

## My Students

A class roster (for each class) is underneath these lessons.

I have wonderful students this year! I mean, seriously awesome. They are very likeable kids who will, for the most part, work very hard and be on task. They are very respectful young people and should respond will to you. Please though, if this does not happen, leave me a detailed note summarizing the situation (sub-notes section is in the back).

TA's –5<sup>th</sup> period – Liana Murzak

**Friday, February 2<sup>nd</sup>**

**AP Calculus AB (Period 2)**

1. Please return the quizzes to the class (they should be easily seen on the desk with a sticky note to designate them, unless the sub on Thursday shifted the around)

The students are responsible today for learning the following topics (both pretty easy, though the book nerds out completely and makes it appear to be rocket science).

- a. Mean Value Theorem
- b. Intermediate Value Theorem

So, I am going to have you do a little calculus 'teaching' today...but seek out help OR, better yet, conscript somebody to go through this script for you! ... good luck with that  
☺

So, here is the scoop:

Read everything...it is fine to show all the notes under the doc camera

Students should write down in their notes all of the stuff that is boxed.

The assignment is posted on the website (with a video tutorial link if the students still want)

### Lesson Goal

Today you are responsible for understanding and **applying** two different theorems:

- The Mean Value Theorem (MVT)
- &
- The Intermediate Value Theorem (IVT)

*\*\*AP Test Note: when completing an FRQ on the AP exam where the application is required...it is entirely OK (and recommended) to use the abbreviations MVT or IVT. ... conversely, it is also ok to not refer to either theorem but to, instead, essentially restate the theorem without referring to the name of the theorem being used (though you will find the latter tiresome and not very efficient...)\*\**

Let's start with the Intermediate Value Theorem (it is painful that this is actually called a theorem...I say painful cause it seems so obvious to most everyone...but as soon as they (calculus peoples) use the word 'theorem', it creates doubt in folks' minds...like 'it can't be this easy if they actually made a calculus theorem for it!?' ... IT IS THIS EASY (well...I think you will find the theorem to be easy anyhow):

So here goes:

**Intermediate Value Theorem (IVT)**... .. SO ... I'm just going to call it the IVT from now on if you guys are cool with that.

Wait!!...before we start...I forgot to say earlier...so I'm saying now:

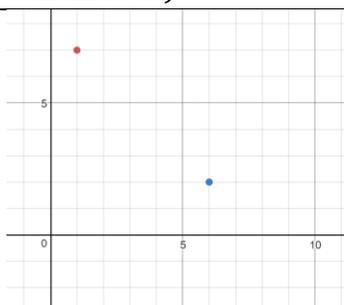
To use the IVT, you need to show (or be told, as is often the case in AP FRQ's) that the function you are dealing with is continuous (either entirely ... or on the interval you are dealing with).

So...check...got that out of the way. The function needs to be continuous

After you establish or have been told the function is continuous, you will use the IVT to 'guarantee' there exists a point with a certain y-coordinate. But this will be easier to explain with an example.

--by the way, for those of you who like to overcomplicate things, the book has a convoluted explanation on page 77 and 78. OR...if you go to the scubamoose website, the flipped calculus guy (we looked at his stuff a while back) has a video that supports this idea too. As a matter of fact, our assignment is off his website (has solutions too!)

Let's talk about the IVT by using a graph. Plot two points (1,7) and (6,2). Now draw a continuous function to connect the two points (this is not a trick ... just make sure it is continuous)



(pause to let them draw their graphs)

Once you are done ... show your graph to your neighbor...make sure your neighbor's graphs are continuous functions

(pause again to let them compare)

We good?.. (pause) ...awesome, let's continue.

I bet you a \$1...no...I bet you a gazillion billion trillion ....to the 5<sup>th</sup> power dollars that your continuous function has a point somewhere on the interval with a y-coordinate of 5.

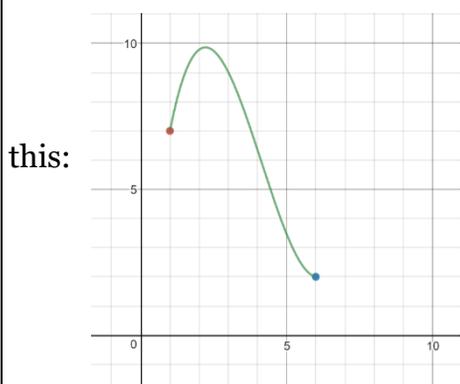
A matter of fact, I'll give you a gazillion billion trillion to the **ninth** power dollars if I'm wrong, but you have to give me a \$1 if I'm right.

Anybody want to take that bet?

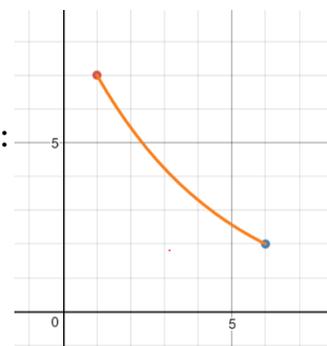
(pause for dramatic effect ☺)

So here is the thing...if you said no...you are either a chicken...or more likely you understand the Intermediate Value Theorem!  
(applause...whoop and holler!!)

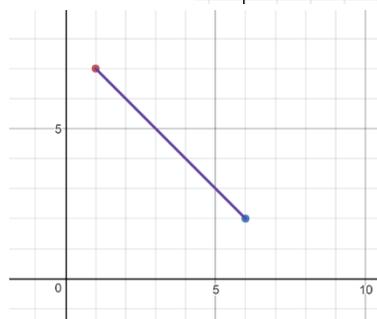
So maybe you drew your function looking something like



Or, if you are less adventurous, like this:



Or, if you are...you know...kinda boring, something like this:



No matter how you drew your function...it was guaranteed that there was a point with an x value between 1 and 6 (the end points) that had a y coordinate of 5...

\*\*Note, we can actually make the above statement about ANY y-value between 2 and 7, not just 5

So let's do an example of the IVT being used.

Problem 1:

For the function  $f(x) = x^3 + x^2 - 8x - 6$  show if there exists some point in the interval  $[-1,3]$  with a y-coordinate of 4. Explain why or why not.

If there exists a point with a y-coordinate of 4, find the x-value of the point.

Work	Notes (step)
	1: is the function continuous?
1: Since $f(x)$ is a polynomial...guaranteed the function is continuous for all $x$ 's...thus definitely between -1 and 3.	
	2: Establish the endpoints
2: $f(-1) = -1+1+8-6 = 2$ and $f(3) = 27+9-24-6=6$  $f(-1) = 2$ and $f(3) = 6$ or $(-1,2)$ and $(3,6)$ are on the graph.	
	3. use the IVT to determine if there exists a point with a y-coordinate of 4
3. Since 4 is in between the y-coodinates of the endpoints ... i.e. 4 is in between 2 and 6. The IVT guarantees the existence of a point with the y-coordinate of 4.	
	4. Find the x-coordinate of the point whose y-coordinate is 4
4. (on calculator) Graph in y1: $x^3 + x^2 - 8x - 6$ Graph in y2: 4 Find the intersection of the two graphs.  The x-coordinate is 2.917 Or $(2.917, 4)$	
	5. Celebrate
5. Woohoo!	

So let's do another example of the IVT being used.

Problem 2:

For the function  $f(x) = \frac{8}{x-3}$  show if there exists some point in the interval  $[4,7]$  with a y-coordinate of 3. Explain why or why not.

If there exists a point with a y-coordinate of 3, find the x-value

Work	Notes (step)
	1: is the function continuous?
1: $f(x)$ is continuous at all points except when $x = 3$ ...but since 3 is not in the interval $[4,7]$ it is correct to say the function is continuous in the interval $[4,7]$	
	2: Establish the endpoints
2: $f(4) = 8/(4-3) = 8$ and $f(7) = 8/(7-3) = 2$  $f(4) = 8$ and $f(7) = 2$ or $(4,8)$ and $(7,2)$ are on the graph.	
	3. use the IVT to determine if there exists a point with a y-coordinate of 3
3. Since 3 is in between the y-coordinates of the endpoints ... i.e. 3 is in between 2 and 8. The IVT guarantees the existence of a point with the y-coordinate of 3.	
	4. Find the x-coordinate of the point whose y-coordinate is 3
4. (no calculator needed) Set the function equal to 3 and solve $f(x) = \frac{8}{x-3}$ $3 = \frac{8}{x-3}$ $3(x-3) = 8$ $3x - 9 = 8$ $x = \frac{17}{3}$	

Try the problems from the book first (only 4 questions for this part of the assignment)

Page 80-81

#'s 87, 89, 95, 97

When finished...check the back of the book for answers and/or one of the solution guides (volume 1's) stacked next to the sink.

Then go to the scubamoose website to access the 2<sup>nd</sup> part of the assignment

This will be (should be) pretty easy to find...it will be the first drop down link...labeled **Feb 2<sup>nd</sup> sub day!**

Assignment:

Text book:

Page 80-81

#'s 87, 89, 95, 97

On the posted worksheet:

Questions 20 – 26

AND

The entirety of the 'TEST PREP' problems (the last 4 pages of the document).

I've decided I'm done for today. We will do the MVT on first 1/2 of Tuesday next week.

## SUB NOTES

Your name: \_\_\_\_\_

### Contact Info

Email: \_\_\_\_\_

Phone (optional): \_\_\_\_\_

Would you consider subbing in this classroom again? YES or NO

### **Generally, how was your day at HeLa H.S.?**

*Scale of 1 to 5 (1 is not so good / 5 is great)*

Please rate the plans you received: \_\_\_\_\_

How comfortable are you with math content: \_\_\_\_\_

Please rate how welcome you felt by the students: \_\_\_\_\_

Please rate your overall experience today: \_\_\_\_\_

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### Individual class notes:

#### **Period 1 -- PAAPAT**

How was class behavior: \_\_\_\_\_

Did class start on time: \_\_\_\_\_

How respectful were the students towards you: \_\_\_\_\_

How on-task was class: \_\_\_\_\_

Comments:

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#### **Period 2 – Calculus AB**

How was class behavior: \_\_\_\_\_

Did class start on time: \_\_\_\_\_

How respectful were the students towards you: \_\_\_\_\_

How on-task was class: \_\_\_\_\_

Comments:

**Period 3 -- Statistics**

How was class behavior: \_\_\_\_\_  
Did class start on time: \_\_\_\_\_  
How respectful were the students towards you: \_\_\_\_\_  
How on-task was class: \_\_\_\_\_  
Comments:

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**Period 5 -- Calculus BC**

How was class behavior: \_\_\_\_\_  
Did class start on time: \_\_\_\_\_  
How respectful were the students towards you: \_\_\_\_\_  
How on-task was class: \_\_\_\_\_  
Comments:

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**Period 7 -- PAAPAT**

How was class behavior: \_\_\_\_\_  
Did class start on time: \_\_\_\_\_  
How respectful were the students towards you: \_\_\_\_\_  
How on-task was class: \_\_\_\_\_  
Comments: