AMATYC 2021 – Themed Session
Using Projects as Primary Assessments

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Teaching Turning Point #1

“When am I ever going to use this?”
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Teaching Turning Point #2

How to Maintain Integrity in your Online Classes
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Teaching Turning Point #3
Seinfeld Can Scam Activity
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Benefits of Project Assessments

1. Students don’t know when to forget material
2. All but eliminates monitoring for cheating
3. Grading is more interesting
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Benefits of Project Assessments

4. More Interaction Between Students

5. Relieves Test Anxiety
There are plenty of other ways to assess students that are just as effective don’t take as much class time as exams.

Giving five exams takes about 15% to 20% of your course time.
Have Students Create Their Own Applications

It forces students to connect material outside of the classroom.

It allows students to do things that are fun for them.

There’s not an app for that.
Upon completion of this course, the student can:
1. Recognize functions and specify the domain and the range of a given function.
2. Graph linear, quadratic, polynomial, rational, exponential, logarithmic, and piecewise functions.
3. Write expressions from data, verbal descriptions, or graph.
4. Solve polynomial, rational, exponential, and logarithmic equations.
5. Solve application problems using linear, quadratic, exponential, and logarithmic functions.
6. Perform operations with functions and find inverse functions.
7. Solve linear and nonlinear systems of equations.
8. Solve nonlinear inequalities.
**MID-TERM PROJECT**

**MAT 150**

Each student needs to sign up for a country at this link. First come, first served.

[https://www.signupgenius.com/go/10C084FAAAE2CA3F85-zombie](https://www.signupgenius.com/go/10C084FAAAE2CA3F85-zombie)

Using the website from class, look up the current country population for your country and the current growth rate.

Zombies have invaded the United States and sadly, we didn’t put up much of a fight. The zombies are chasing you. You see a helicopter in the distance bound for safety. You and your band of zombie fighters have been able to leave for the country you chose.

Unfortunately, you have accidentally transported some contaminated hot dogs with you and four members of your group have eaten them. Fortunately, you have noticed this in time and the rest of your party has captured these people before they have turned in to zombies and thrown them off of the plane before landing. You live happily in your new country for a year when you hear a sobering report. The original group of contaminated people that you have thrown from the plane has grown into eighteen. The zombification is spreading although slowly. You feel pretty safe that it is contained for the moment but are worried that it might eventually overwhelm the country.
Create an Excel graph showing the exponential equation for your country and for the zombie growth next to it. Extend the graphs to the first year after the two intersect. Calculate the point of intersection. Show all work.

Determine a reasonable length of time when the people in the country notice the problem and organize an army to fight the zombies. You will not be able to completely stop the growth but should be able to slow it down. Determine what the new growth rate for the zombies will be once you have the army formed and remake the graph with your new information. You do not need to find equations at this point. Estimate how long it will take now before the zombies are able to overtake the country.
Write up a mission report in Word which includes all of the required information, graphs, explanations, etc. Organization, creativity, and presentation will figure into the grade.

You need to record a 1 – 2 minute video for this project. Your video needs to include you explaining your growth rates and factors for the two equations along with your estimation of the point of intersection and what that means. I will need to see your face at some point in the video. You should do these parts without any assistance from anyone else or without reading from a “script”. (*SUBMISSIONS WITHOUT A VIDEO COMPONENT WILL RECEIVE A ZERO. This is a required part of this assignment.*)

During the week before Spring Break, you will need to make an appointment with me on Zoom to present your project. You should then be prepared to answer any questions about the process you used or the analysis of the results. Your Project will be due to me by that time.
Create an Excel graph showing the exponential equation for your country and for the zombie growth next to it. Extend the graphs to the first year after the two intersect. Calculate the point of intersection. Show all work.

\[ 4e^{1.5041t} = 162,000,000e^{0.0103t} \]
\[ e^{1.5041t} = 40,500,000e^{0.0103t} \]
\[ e^{(1.5041-0.0103)t} = 40,500,000 \]
\[ 1.4938t = \ln(40,500,000) \]
\[ t = \frac{\ln(40,500,000)}{1.4938} \]
\[ t = 11.7 \]
Upon completion of this course, the student can:

1. Recognize functions and specify the domain and the range of a given function.
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Drawbacks of Project Assessments

1. It does take time for both you and the students
2. It does take a leap of faith in your students
3. Grading is in the gray area
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Use a Course Project Instead of a Final

Students must create an original application based on course material.
It includes a live presentation with me and with the public...at least when we are not quarantined.
COURSE PROJECT
MAT 150

Throughout the course, we have been looking at many examples of the material that applies to activities outside of the classroom (movies, TV shows, history, current events, etc.). This project will give you the opportunity to create one of these applications of your own.

You need to select a scene from a movie, TV show, novel, famous historical event, current event, etc. and a practical, relevant, and interesting question to base your project on. You will need to analyze the topic in question using skills that we’ve learned in this course. You could determine whether the scene was done properly or not. You could also analyze the scene in a way that would be beneficial to the context that you found it. You could use the skills learned to apply to a current event or historical event. There are other possibilities but we would need to discuss those.
Grade Breakdown

Choice of Topic / Creativity: 25 points

This section will be based on the type of problem you decide to use. Problems should be original, interesting, substantial, and creative. Problems that are too similar to class examples will not receive high marks. Problems that are too simple will not receive high marks. Students are welcome to share their ideas with me for feedback, but I will not suggest ideas or do your thinking for you. The longer it takes you to come up with a topic, the less chance you will have of getting the full 25 points for this part.
Mathematical Calculations/Accuracy: 50 points

This section will be based on the calculations that you perform for your project. Computer-written work is generally better than hand-written work. I will be looking for the right type of calculations to have been done and whether they are calculated properly. Students are welcome to have me look over their problems and calculations for feedback, but I will not correct any calculations or suggest what needs to be calculated. I will just let you know if the calculations you have done are correct or not.
Project Display / In-Class Presentation: 75 points
This section will be based on the way you organize and present your work. Students will need to create a PowerPoint of their project that will be emailed to me. It should be easy to follow, neatly done, and presented in a way that is appealing to the viewer. During Final Exam week, you will need to make an appointment with me on Zoom to present your project. You should then be prepared to answer any questions about the process you used or the analysis of the results. Your Project will be due to me by that time. You should be prepared to explain (a) what your topic is (b) why you decided to do what you did (c) how you approached getting the answer and (d) an analysis of what you found.

Once you have explained your project, I will ask you a few questions to see how well you really understand what you did. You should then be prepared to answer any questions about the process you used or the analysis of the results. The PowerPoint part will be worth 25 points and the explanation/discussion will be worth 50 points.
I have a severe case of myopia. I was diagnosed as young as 2 years old. Each optometrist appointment getting worse and worse – to the point I can no longer see as little as 12in in front of me.

My 9 year old daughter had 20/20 vision one year ago – today she has developed myopia. Being as this is a genetic condition, it was hard to hear because I personally know how difficult it is to lose such a great amount of vision overtime...and her reason for developing myopia is likely a result from my poor genetics.
What does a normal nonmyopic eye look like?

This is a visual representation of a normal eye.

It is a full circle.

With a formula of:

\[(x - 0)^2 + (y - 0)^2 = 0.8^2\]

Normal Vision
What does a myopic eye look like?

A myopic eye, turns into an ellipse.

The formula for this particular image being:

\[
\frac{x^2}{2.7^2} + \frac{y^2}{2.4^2} = 1
\]
Just how much can this help?

MiSight was clinically shown to reduce the progression of myopia by 50%.

My daughter’s eyes were operating at a Snellen notation distance of 20/20 one year ago.

Today she needs a prescription of -1.25 and is operating at notation distance of 20/50 – that is a percentage visual efficiency of 76.5% with the percentage vision loss of 23.5.
Charts where data was pulled.

<table>
<thead>
<tr>
<th>Snellen Notation For Distance</th>
<th>Snellen Notation For Near</th>
<th>Percentage of Visual Efficiency</th>
<th>Percentage Loss of Vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/20</td>
<td>14/14</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>20/25</td>
<td>14/17.5</td>
<td>95.7</td>
<td>4.3</td>
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<td>14/21</td>
<td>91.5</td>
<td>8.5</td>
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<tr>
<td>20/35</td>
<td>14/24.5</td>
<td>87.5</td>
<td>12.5</td>
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<td>20/40</td>
<td>14/28</td>
<td>83.6</td>
<td>16.4</td>
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<td>20/45</td>
<td>14/31.5</td>
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<td>20.0</td>
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<tr>
<td>20/50</td>
<td>14/35</td>
<td>76.5</td>
<td>23.5</td>
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<tr>
<td>20/60</td>
<td>14/42</td>
<td>69.9</td>
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</table>

<table>
<thead>
<tr>
<th>Snellen</th>
<th>Estimated prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/10</td>
<td>Plano (zero)</td>
</tr>
<tr>
<td>20/15</td>
<td>Plano</td>
</tr>
<tr>
<td>20/20</td>
<td>Plano to -0.25</td>
</tr>
<tr>
<td>20/30</td>
<td>-0.50</td>
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<td>20/40</td>
<td>-0.75</td>
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<td>20/50</td>
<td>-1.00 to -1.25</td>
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<tr>
<td>20/100</td>
<td>-1.75 to -2.00</td>
</tr>
<tr>
<td>20/200</td>
<td>-2.00 to -2.50</td>
</tr>
</tbody>
</table>

http://www.ic.nc.gov/ncic/pages/vision.htm

https://www.iblindness.org/
Exponential Chart

Myopia Progression

\[ y = 1.25e^{0.2111x} \]

\[ y = 1.25e^{0.1111x} \]
Conclusion

With the research and mathematical finding I was able to conclude that with CooperVision Misight my daughter will gain 8 more years before her vision declines to -8.

She will gain 8 more years before she is ineligible for LASIK correction vision.

These odds are staggering and incredibly beneficial to my daughter. This is definitely an option we will be looking into to provide a decrease in her myopic condition.