YES!! ... YOU HAVE TIME TO COVER THAT

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OUTLINE

1. INTRO
2. DISCLAIMERS
3. PHILOSOPHY...STRATEGY
4. EXAMPLES
INTRO

1. TIME IS THE USUAL REBUTTAL FOR CHANGE

2. CURRICULUM CHANGES

3. ALLOWS FOR MORE INTERACTION WITH STUDENTS

4. ALLOWS TO ADD RELEVANT FUN THINGS TO CLASS
DISCLAIMERS

1. THESE ARE SUGGESTIONS NOT PREACHING

2. THIS DOESN’T HAPPEN OVERNIGHT
3. UNLESS YOU ARE WILLING TO MAKE CHANGES TO THE WAY YOU'VE ALWAYS TAUGHT, THEN...

...NO...
YOU WILL NOT HAVE TIME TO COVER THAT
4. Some faculty might feel pressured to comply with veteran faculty or departmental philosophy...

...but small changes are still possible
DISCLAIMERS

5. THESE STRATEGIES CAN BE ADAPTED TO MOST CURRENT TEACHING “PHILOSOPHIES”
TIME HEIST
PHILOSOPHY STRATEGY

BUT I HAVE TO GIVE 4 OR 5 EXAMS DURING THE SEMESTER

NO YOU DON'T!
Philosophy Strategy

There are plenty of other ways to assess students that don't take as much class time as exams. 15 to 20 percent of course
Assessment
Alternates

If you feel you need to have exams or quizzes, have many short online quizzes...

...cheating is always a possibility, but you can set them up to minimize this.
In class activities either during the same class or the start of the next encourages students to pay attention and come prepared.
IN CLASS ACTIVITIES
\[\tan 60^\circ = \frac{x}{44}\]
\[x \approx 76 \text{ ft}\]
STUDENT RECORDED VIDEOS

HAVE STUDENTS RECORD THEMSELVES WORKING OUT OR EXPLAINING A PROBLEM... 1 OR 2 MINUTES IS FINE

NO CLASS TIME INVOLVED... GRADING TIME IS LESS THAN FOR EXAMS
PHILOSOPHY STRATEGY

BUT I HAVE TO COVER ALL OF THE REQUIRED MATERIAL DURING CLASS TIME

NO YOU DON'T!
PHILOSOPHY
STRATEGY

With so much technology available, there are plenty of ways to cover smaller topics outside of class time.
Lecture Alternates

- Multi Variable Regression
  - Add description
  - 6:42

- Roller Coaster
  - Add description
  - 12:12

- Captain America Solution
  - Add description
  - 2:41

- Uploading To YouTube
  - Directions for uploading a video to YouTube
  - 6:14

- Equation Editor Directions
  - Directions for using Word's Equation Editor feature to create mathematical...
  - 8:28

- Getting Office and Sending Files
  - Directions for downloading MicroSoft Office to your computer and the proper...
  - 8:22
Use prerecorded videos either that you create or find online.

Create written notes and examples.

Use student work submissions as answer keys.
PHILOSOPHY STRATEGY

BUT I HAVE TO TEACH THIS AS A PRE-REQUISITE TO THE NEXT COURSE

NO YOU DON'T!
Philosophy Strategy

Many students are not taking the course as a pre-requisite to a later course.

Are your course descriptions set up that way?
PHILOSOPHY

STRATEGY

BESIDES... A PROPER CONCEPTUAL APPROACH INSTEAD OF AN OVERLY RIGOROUS APPROACH WORKS JUST THE SAME
Instead of a final project, you 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 instead of final
The first time that Tony measures his blood toxicity is during the Stark Expo, and it is 19%. Assume that the Stark Expo is happening around 8 PM at night.

The next time he measures his blood toxicity is two days later in the morning, and it is now 24%. Assume that it is 10 AM.

38 hours pass between the time that it is 19% and the time that it is 24%.

Exponential Growth Equation:
\[ A = A_0 e^{kt} \]

- \( A = 24 \)
- \( A_0 = 18 \)
- \( k = \text{unknown} \)
- \( t = 38 \text{ hours} \)
PHILOSOPHY
STRATEGY

YOU GET MORE STUDENTS INTERESTED IN STEM BY GOING DEEPER INTO THE MATH

NO YOU DON'T!
PHILOSOPHY
STRATEGY

STUDENTS...OR ANYONE...GETS MORE
INTERESTED IN SOMETHING
BECAUSE THEY ENJOY IT!

TEACH YOUR CLASS IN A WAY
THAT STUDENTS WILL ENJOY
LEARNING MATH
CREATE APPLICATIONS

FORCES STUDENTS TO CONNECT MATERIAL OUTSIDE OF THE CLASSROOM

allows students to do things that are fun for them

there's not an app for that
Homer's BMI

Using the formula $B = \frac{700w}{h^2}$ we are going to plug in his height(h) and weight(w) into this formula.

$B = \frac{700(240)}{70.8^2}$

Homer's BMI is...

33.52

• Does the wing length add up? According to the "Jeepers Creepers" wiki page, the Creeper is 6 feet and 3 inches so his wings being 7 feet and 3.7 inches doesn’t sound too far off at all.
Create Applications

Finding the Equation of a Hyperbola

The formula for this hyperbola is: \[
\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1
\]

\((h,k)\) is the center point of the hyperbola.
The graph shows the center point as \((0,0)\).
a is the distance from the center to the vertex. In this graph, our vertexes are \((0,2), (0,-2)\).
So, \(a = 2\)
Now we need to find \(b\). To do this, we need to know that for a vertical hyperbola, our slope is \(\frac{a}{b}\).
The slope of our positive asymptote is \(\frac{1}{1}\) meaning that the asymptote goes up one and over one.
We know that \(a = 2\), and from the slope we know that \(b\) also equals 2.
So our equation is: \[
\frac{(y)^2}{4} - \frac{(x)^2}{4} = 1
\]
CREATE A PROJECTILE MOTION PROBLEM FOR WILE E. COYOTE
BENEFITS OF CREATING APPLICATIONS

STUDENTS DON'T KNOW WHEN TO FORGET MATERIAL

ALL BUT ELIMINATES MONITORING FOR CHEATING

GRADING IS MORE INTERESTING
PHILOSOPHY STRATEGY

BUT I HAVE TO COVER CALCULATING ZEROES OF POLYNOMIALS

NO YOU DON'T!
PHILOSOPHY
STRATEGY

TEACH THE COMPETENCIES...NOT THE TEXTBOOK

DISCLAIMER...THIS IS NOT A KNOCK ON TEXTBOOKS OR PUBLISHERS
Don't try to cover all possible examples...

...let the students do that.
START WITH MAIN CONCEPTS... DETAILS AND MASTERY COME LATER

Code #1: $C(n) = 3n + 5$

START WITH MAIN CONCEPTS...DETAILS AND MASTERY COME LATER

Code #3: $C(n) = n^2 + 4$

533 – 68 – 229 /
Use spreadsheets or other technology to speed things up.

### Quadratic Equation Solver

<table>
<thead>
<tr>
<th>a</th>
<th>Solution #1 = #DIV/0!</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Solution #2 = #DIV/0!</td>
</tr>
<tr>
<td>c</td>
<td></td>
</tr>
</tbody>
</table>
## Decay Rate Solver

<table>
<thead>
<tr>
<th>TO FIND 'k'</th>
<th>TO ANSWER QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Amount =</td>
<td>Initial Amount =</td>
</tr>
<tr>
<td>Ending Amount =</td>
<td>Time Decaying =</td>
</tr>
<tr>
<td>Half-Life =</td>
<td>Ending Amount =</td>
</tr>
<tr>
<td>Decay Rate = #DIV/0!</td>
<td>Time Decaying = #DIV/0!</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>PROFIT</strong></td>
<td></td>
</tr>
<tr>
<td>Original Price =</td>
<td></td>
</tr>
<tr>
<td>Original Customers =</td>
<td></td>
</tr>
<tr>
<td>Change in Price =</td>
<td></td>
</tr>
<tr>
<td>Change in Customers =</td>
<td></td>
</tr>
<tr>
<td>Fixed Costs =</td>
<td></td>
</tr>
<tr>
<td>Variable Costs =</td>
<td></td>
</tr>
<tr>
<td>COMPOUNDING PERIODICALLY</td>
<td>COOLING RATE SOLVER</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Principal =</td>
<td>TO FIND 'k'</td>
</tr>
<tr>
<td></td>
<td>Initial Temp =</td>
</tr>
<tr>
<td></td>
<td>Ending Temp =</td>
</tr>
<tr>
<td></td>
<td>Room Temp =</td>
</tr>
<tr>
<td></td>
<td>Time Between Temps =</td>
</tr>
<tr>
<td>Interest Rate (as decimal) =</td>
<td>Cooling Rate =</td>
</tr>
<tr>
<td></td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>Years =</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>Compounding Periods =</td>
<td>TO ANSWER QUESTION</td>
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<tr>
<td></td>
<td>Initial Temp =</td>
</tr>
<tr>
<td></td>
<td>Ending Temp =</td>
</tr>
<tr>
<td>Total Value =</td>
<td>Time =</td>
</tr>
<tr>
<td>#DIV/0!</td>
<td>#DIV/0!</td>
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<tr>
<td>Monthly Payment =</td>
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### Large Sample vs. Large Sample

<table>
<thead>
<tr>
<th>Sample Mean 1</th>
<th>z-value</th>
<th>Sample Standard Deviation 1</th>
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</table>

<table>
<thead>
<tr>
<th>Sample Size 1</th>
<th>Sample Mean 2</th>
<th>Sample Standard Deviation 2</th>
<th>Sample Size 2</th>
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</thead>
</table>

### Chi-Square

<table>
<thead>
<tr>
<th>Item #</th>
<th>Observed</th>
<th>Expected</th>
<th>O - E</th>
<th>$(O - E)^2$</th>
<th>$(O-E)^2/E$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #1</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>Item #2</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>#DIV/0!</td>
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<tr>
<td>Item #3</td>
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<td>0</td>
<td>0</td>
<td>#DIV/0!</td>
</tr>
<tr>
<td>Item #4</td>
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<tr>
<td>Item #5</td>
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<td>0</td>
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<td>#DIV/0!</td>
</tr>
<tr>
<td>Item #6</td>
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<td></td>
<td>0</td>
<td>0</td>
<td>#DIV/0!</td>
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</tbody>
</table>

$X^2 = $ #DIV/0!
A well chosen problem is better than many examples.
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.
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.

\[
B(t) = 162,000,000e^{0.01t}
\]

\[
Z(t) = 4e^{1.5041t}
\]

\[
1.5041t = \ln(40,500,000)
\]

\[
t = \frac{\ln(40,500,000)}{1.4938} 
\]

\[
t = 11.7
\]
Upon completion of this course, the student can:
1. Recognize functions and specify the domain and the range of a given function.
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.
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8. Solve nonlinear inequalities.
Philosophy
Strategy

As with anything in life... you make time for what is important.

Think about what is the most important thing for the students and build class around that.
Philosophy
Strategy

“I STOPPED TEACHING MATH AND STARTED TEACHING STUDENTS”
QUESTIONS??

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