Take the first step. The rest will follow.

You have learned so much already. Trust your hard work.

Think forward. Check backward.

Don’t be afraid to try (and then ask questions.)

You’ve made it this far. Now take another step.

Think of a time you helped someone in this class. Now be that person for yourself.

Your hard work and practice will shine through.

Believe in your skills and yourself.

A test is just a test. Learning is for life.
You can.

You will.

Climb high.
Climb far.
Your goal the sky.
Your aim the star.

Take a deep breath,
count to ten,
And relax.

Anyone who has never made a mistake has never tried anything new.

--Albert Einstein

You know so much more now than you did before! Use it.

You are on the right track. Keep going.

Do what you can with what you have where you are.

Always try.

If you think you can, you can.
I can do hard things. I know this because I’ve done hard things before.

Mistakes are okay. They are a part of learning.

Yes. I. Can.

Yes I can!

I don’t have to be perfect to be good at math.

You have a mathematical mind.

I believe in you.

Take your time. Do your best. Speed is not the purpose of the test.

Close your eyes and imagine yourself succeeding. Now open your eyes and do it.

You are the director, producer, and writer of your own movie. Continue writing the script.
You are amazing. Think what you have already conquered to be here right now.

I must not fear. Fear is the mind-killer.
--Frank Herbert
Dune

I can get unstuck by asking questions.

Positive Possum believes you can do the thing.

I have the power to create change and earn good things I deserve.

Don’t panic. You don’t have to be an expert. Ask for help. Breathe.

I will try. If I mess up, I will try again. That makes me a mathematician.

Never think “I can’t.” Instead think “I’ll try.”

Change your perspective and IMPOSSIBLE can become I’M POSSIBLE.
Be strong. Be brave. Be kind. Bring your best self and know that is enough.

A river cuts through a rock not because of its power but its persistence.
-unknown

It’s the job that’s never started that takes the longest to finish.
-Samwise Gamgee

Don’t let the test bug you.

My past experiences can’t stop me from succeeding in the present.

I know enough.
A Post Pandemic Proposal

47th AMATYC Annual Conference
Phoenix, AZ

Jennifer Quinn
MAA President 2021-2022
University of Washington Tacoma

jjquinn@uw.edu
Humanizing Mathematics
Humanizing Mathematics
Question:

How do I operationalize the belief that mathematics is…

everywhere

and

for everyone

in my own classroom?
You first

Complete this statement:

The biggest barrier(s) to success for my students….

Go to student.desmos.com
and type in:

TU8 8HX
There is only one thing that makes a dream impossible to achieve: the fear of failure.
Disclaimer

This is a work in progress.

No magic bullets.

Everyone is different.
## Value of Exams

### Pre-Pandemic (2018)

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Homework (Tuesday, Friday)</td>
<td>15%</td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Project portfolio</td>
<td>15%</td>
</tr>
<tr>
<td>Midterms (x2 17.5%)</td>
<td>35%</td>
</tr>
<tr>
<td>Final</td>
<td>30%</td>
</tr>
</tbody>
</table>

**Total**: 100%

### Pandemic (2020)

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Homework (Tuesday, Friday)</td>
<td>15%</td>
</tr>
<tr>
<td>Participation--Daily Homeworks</td>
<td>5%</td>
</tr>
<tr>
<td>Participation--Discussion and Activities</td>
<td>5%</td>
</tr>
<tr>
<td>Project portfolio</td>
<td>30%</td>
</tr>
<tr>
<td>Midterms</td>
<td>20%</td>
</tr>
<tr>
<td>Final</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Total**: 100%

### Post-Pandemic (2021)

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Homework (Tuesday, Friday)</td>
<td>15%</td>
</tr>
<tr>
<td>Weekly Writing Reflections</td>
<td>5%</td>
</tr>
<tr>
<td>Participation--Daily Homeworks</td>
<td>5%</td>
</tr>
<tr>
<td>Participation--Discussion and Activities</td>
<td>5%</td>
</tr>
<tr>
<td>Project portfolio</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Final</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Total**: 100%
Positive Affirmations

You are amazing.
Think what you have already conquered to be here right now.
Positive Affirmations
Positive Affirmations

Think of a time you helped someone in this class. Now be that person for yourself.
Positive Affirmations

Believe in your skills and yourself.

Don't be afraid to try (and then ask questions).

You can. You will.

Think of a time you helped someone in this class. Now be that person for yourself.

Take the first step. The rest will follow.

You've made it this far. Just take another step.

You have learned so much already. Trust your hard work.

Think forward. Check backward.

Test is just a test. Learning is for life.

Your hard work and practice will shine through.
Remote Affirmations

**Encouragement**

Everybody needs a little pick me up and today may be that day. Write yourself (or your fellow students) a positive affirmation. Or post a meme that helps you feel focused.

<table>
<thead>
<tr>
<th>Positive Possum believes you can do the thing.</th>
<th>This is hard and I can do hard things.</th>
<th>I have the power to create change and get those good things I deserve. Pain is just weakness leaving the body.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It can’t get worse. No pain No gain.</td>
<td>Every adversity, every failure and every heartache carries with it the seed of an equivalent or greater benefit.</td>
<td></td>
</tr>
<tr>
<td>Treat all problems as basic and known. If all questions are like 1+1 or 2x2, then they are really not terrible.</td>
<td>Every adversity, every failure and every heartache carries with it the seed of an equivalent or greater benefit.</td>
<td></td>
</tr>
<tr>
<td>The harder you work for something, the greater you’ll feel when you achieve it.</td>
<td>It is better to know some of the questions than all of the answers. –James Thurber</td>
<td></td>
</tr>
<tr>
<td>Plus some great links: Jokes Motivating “GOOD” Life</td>
<td>Squidward rainbow: <a href="https://www.youtube.com/watch?v=ix8Nzoxn5iw">https://www.youtube.com/watch?v=ix8Nzoxn5iw</a></td>
<td>If you ever feel useless, just remember atlanta was up 28-0 over new england!</td>
</tr>
</tbody>
</table>

*Source: MAA (Mathematical Association of America)*
Post-COVID: Mathematical Affirmation Deck

Available at https://tinyurl.com/mathaffirmation
Minimizing Computational Assessment during COVID

Skills Heavy
PreCalculus I

Concept Heavy
Matrix Algebra; Calculus II
Minimizing Computational Assessment during COVID

**Skills Heavy**
PreCalculus I

**Concept Heavy**
Matrix Algebra; Calculus II

Mastery Based Grading
Projects Instead of Midterms
Cumulative Final as a last chance to prove mastery of learning goals

Oral Assessments
Focus on synthesis & concepts.
PreCalculus I

Mastery Based Grading

• Repeatable assessments. Lower Stress.

• Lower stakes → Less temptation to break honor code

• Document progress and mastery

Projects Instead of Midterms

• More realistic problems

• Math is messy. Interpretation and decisions.
Project Activity

Return to Desmos (slide 4)

Project 1 compares primary school attendance rate to households with access to clean drinking water for 11 different countries (Belarus, Ghana, Oman, Senegal, and the Solomon Islands.)

Explores slope and y-intercept through a least squares visualization in Desmos.
PreCalculus I

Mastery Based Grading

• Repeatable assessments. Lower Stress.

• Lower stakes → Less temptation to break honor code

• Document progress and mastery

Projects Instead of Midterms

• More realistic problems

• Math is messy. Interpretation and decisions.

Blog available at mathinthetimeofcorona.wordpress.com
Oral Assessments

Concept Heavy
Matrix Algebra; Calculus II

Oral Assessments
Focus on synthesis & concepts.
General Method

• Questions and rubric distributed in advance

• Use all available resources to prepare

• Interviews of 20-30 minutes
  • First question student choice (lead with their strength)
  • Second question my choice (pass available for a price.)
  • Third straight forward computational question, if needed.
Rubric (Calc II)

Verbally modified to include an error of omission of important concept as a nontrivial calculus error

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 %</td>
<td>Well-executed. Thorough discussion. All points are well supported. One or fewer minor errors. No nontrivial errors.</td>
</tr>
<tr>
<td>B</td>
<td>85 %</td>
<td>Generally well-executed. Several minor errors; or a nontrivial calculus error that gets corrected when identified.</td>
</tr>
<tr>
<td>C</td>
<td>75%</td>
<td>Uncorrected nontrivial error; or several nontrivial errors that get corrected when identified; or error in fundamental understanding, that gets corrected when identified.</td>
</tr>
<tr>
<td>D</td>
<td>60%</td>
<td>Error in understanding of fundamental concept that does not get corrected.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>No evidence of preparation or understanding. Did not comply when requested to view contents of screen.</td>
</tr>
</tbody>
</table>

- *(20 points)* The first question will be **your choice.**
- *(20 points)* I choose the second question from the ones remaining.
  - You may pass on my choice once for a 4 point penalty. If the pass is used, I select another problem.
- *(10 points)* A randomly selected but straightforward antiderivative will be given to you to compute.
Was this more humane for students?

- Student knew exactly what to prepare. (I recommend 6 problems).
- No ethical dilemma.
- If a student went down a rabbit hole, I could pull them back and point them in the right direction.
- Students parroting solutions, did not have a depth of understanding, and it showed.
- Most were genuinely appreciative of oral interviews
- Grateful for time together.
Supporting Data

On a scale of 1 to 5, how well prepared did you feel for this assessment? (1= not at all prepared; 5=more than ready)

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2 respondents</td>
<td>4 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5 respondents</td>
<td>11 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7 respondents</td>
<td>16 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>24 respondents</td>
<td>53 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>7 respondents</td>
<td>16 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diagram showing the distribution of responses:

- 1: 2 respondents, 4%
- 2: 5 respondents, 11%
- 3: 7 respondents, 16%
- 4: 24 respondents, 53%
- 5: 7 respondents, 16%
## Supporting Data

How did you prepare for the assessment? (select all that apply)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I worked individually to solve problems</td>
<td>44</td>
<td>98%</td>
</tr>
<tr>
<td>I worked together with other students to solve problems</td>
<td>9</td>
<td>20%</td>
</tr>
<tr>
<td>I compared answers asynchronously with other students</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>I compared answers synchronously with other students</td>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>Used professor's drop in hours</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Used TLC tutors</td>
<td>7</td>
<td>16%</td>
</tr>
<tr>
<td>Used internet resources</td>
<td>38</td>
<td>84%</td>
</tr>
<tr>
<td>Practiced presentations with others</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Practiced presentations alone</td>
<td>25</td>
<td>56%</td>
</tr>
<tr>
<td>Used textbook</td>
<td>32</td>
<td>71%</td>
</tr>
</tbody>
</table>
Reflections from oral 3:

The only suggestion I can think of to improve the assessments would be to have a bit more time.

Each oral has gotten better and I really enjoyed this individual one (:.

Any change I could think of has already been integrated into these assessments. I can't think of a change that could improve this any better.

Despite making a minor mistake that caused me to miss two points, I think that the individual oral assessment was structured perfectly. All the problems where challenging enough and I felt like I had a suitable amount of time to finish all of them within the time period.
Quick Check-In: How are you doing, really? There is a lot going on in the world and learning remotely is not what any of us really planned on. Give me a number on a scale of -5 to 5 where

5 = Everything is absolutely fantastic.
0 = Meh. Not too good. Not too bad.
-5 = The polar opposite to everything being absolutely fantastic.

The class average was 0.9.
Different assessment
Different reflection

Quick Check-in: How are you doing, really? If you want, you can write a response — I don’t want to pry but I do care.

Thank you for caring…I learn so well in person and being in an online setting is causing me unexpected anxiety and I can’t explain why

I am a bit overwhelmed because this is my first semester at a University while working full time. … I’m stretched a little thin at the moment

I just started a new job and I’m trying to get into the swing of things online. I am good, but it is hard.

Everything is terrible but it’s okay I guess. Honestly, I feel like the workload for this quarter, in general, has been way heavier than usual despite everything being remote, and I feel like teachers aren’t accounting for their student’s having stuff to do outside of school.
Was this more humane for me?

- Tremendous commitment of time (30 Matrix Algebra students, 60 Calculus II students, 28 Matrix Algebra now)
- But once interviews were over, the grading was done.
- Gory details are available on my blog.
Is this a reasonable assessment?

If you want to test for mastery of the material?

If you want to motivate the student effort and provide accountability?

To improve your teaching?

To improve their learning?
Is this a reasonable assessment?

If you want to test for mastery of the material? NO

If you want to motivate the student effort and provide accountability?

To improve your teaching?

To improve their learning?
Is this a reasonable assessment?

If you want to test for mastery of the material? NO

If you want to motivate the student effort and provide accountability? YES

To improve your teaching?

To improve their learning?
Is this a reasonable assessment?

If you want to test for mastery of the material? NO

If you want to motivate the student effort and provide accountability? YES

To improve your teaching? YES

To improve their learning? YES
My Proposal for the Future

• Use assessments that reduce the adversarial relationship between teacher and learner.
  • Oral Assessment even when face-2-face
  • More connection, application, and reflection. Less computation

• Work to diminish anxiety.

• Give grace.

• Dismantle the academic hierarchy.
References and Links

Francis Su

Lessons of Grace in Teaching
7 Exam Questions for a Pandemic

Individual Oral Exams in Mathematics Courses: 10 Years of Experience at the Air Force Academy, Boedigheimer, Ghrist, Peterson, Kallemyn

Jenny Quinn (mathinthetimeofcorona.wordpress.com)

April 25 Day 48: What Have I Done? (mastery based grading)
Oral assessment posts

June 11 Day 95: Finals. Part II (oral in Matrix Algebra)
October 13 Day 219: Examining Exams (Discussion of alternate remote exams with links to prior exams in the Autumn)
October 30 Day 236: “Everything is Terrible But I Guess That’s Okay” (second oral in Calc II)
November 24 Day 261: Individual Orals (third oral in Calc II)
December 18 Day 285: Finally Finished (final in Calc II)

Mathematical Affirmations (https://tinyurl.com/mathaffirmation)
August 20 Day 530: Affirmations in Focus