e-Handout CSU Webcast Assessment in Math and QR in a Virtual World

Description: With the rapid shift to remote teaching and learning during the COVID-19 pandemic, assessment in Math and QR courses presents new challenges for instructors across the California State University.

This workshop is designed to bring instructors together to share, discuss, and make plans for the remainder of the spring term to implement appropriate, equitable assessments in their courses. Professors Matthew Jones (CSU Dominguez Hills), Topaz Wiscons (Sac State), and Stan Yoshinobu (Cal Poly San Luis Obispo) will begin the workshop with some general activities and then break into working groups according to the kinds of courses instructors teach: those involving or leading to calculus (college algebra, pre-calculus, and calculus); those that involve quantitative reasoning without calculus (statistics, math for elementary school teaching); and advanced math courses (linear algebra, differential equations, upper-level math).

People: Matthew Jones, Cal State Dominguez Hills, Topaz Wiscons, Sac State, Stan Yoshinobu, Cal Poly SLO

Time and Date
Tuesday 4/28
10 to 11AM

Breakout Sessions

First open this Google Doc for All Breakout Group Discussions (Link)

Second, select a group to join
1. Group 1: Calc, Precalc, College Algebra, Calc/PreCalc related EO1110. Zoom Link to breakout session: https://calpoly.zoom.us/j/95035013444
2. Group 2: Advanced Math courses (Linear Algebra, Differential Equations, upper-level math). Zoom Link: https://csudh.zoom.us/j/95416614817
3. Group 3: Non-Calc track: Math for elementary, QR, Stats, Stats related EO 1110, QR. Stay in the main session!

https://docs.google.com/document/d/1fQ5KfRatzZ0Ev_fD2xtjhdVvIJNuicYxnG7xNGKfu2Y/edit#

Return to Main Session
https://calstate.zoom.us/j/93844428850?pwd=OHpyQzVvUFVYZ3pDams3YnFTVHM0UT09
Enter this password: 642300

Resources:
1. Virtual Meetups (Link)
2. Problems with e-Proctoring: Article on Washington Post

   "When University of Florida sophomore Cheyenne Keating felt a rush of nausea a few weeks ago during her at-home statistics exam, she looked into her webcam and asked the stranger on the other side: Is it okay to throw up at my desk?

   He said yes. So halfway through the two-hour test, during which her every movement was scrutinized for cheating and no bathroom breaks were permitted, she vomited into a wicker basket, dabbed the mess with a blanket and got right back to work. The stranger saw everything. When the test was finished, he said she was free to log off. Only then could she clean herself up."

3. Inside Higher Ed Article Questioning Cost of e-Proctoring Software (Link) Pull Quote:
   Finally, some academics are critical of administering any exams online. Jill Leafstedt, executive director for teaching and learning innovations at California State University, Channel Islands, said many online exams only show that the test takers could memorize facts.

   "Our exams require thought and application of knowledge," said Leafstedt, who also is the university's senior academic technology officer. "We want to know that they learned, not what they can regurgitate." - Jill Leafstedt

4. Francis Su, Harvey Mudd, "7 Exam Questions for a Pandemic (or any other time)" (Link)
   *So below are a few questions I am considering for a final exam. Notice that all of them are reflective questions that attempt **to explicitly assess the development of virtues**, like the ones I mentioned earlier: persistence, curiosity, imagination, a disposition toward beauty, creativity, strategization, and thinking for oneself. There are plenty more (developed in Mathematics for Human Flourishing)... but let's just consider these.*

5. Open Middle (https://www.openmiddle.com) This website is focused on K-12 instruction. However, one can design similar problems that are appropriate to the content skills in your course. These problems require strategy, and often multiple attempts, to solve - may be more appropriate for un-timed exams. Students are asked to 'make their

thinking visible' by showing an attempt or two before giving their best answer, and answering the following question:

"What did you learn from this attempt? How will your strategy change on your next attempt?"

Examples of Open Middle and backwards questions (link)

6. Academy of Inquiry-Based Learning (www.inquirybasedlearning.org) Not just on assessment, but on developing a whole course.

7. Summer workshops on IBL offered by the Academy of Inquiry-Based Learning. These workshops are mostly about in-person teaching, but will incorporate virtual teaching to the extent that we can. (Link)

8. Mastery Based Grading Conference: (Link)

   What is mastery grading? Mastery grading is an approach to student assessment in which student work is graded directly on whether it demonstrates mastery of a clear list of objectives. Rather than using points or partial credit, final grades are based on the degree of mastery each student has demonstrated of the objectives by the end of the course. Students typically have (or can earn) multiple opportunities to demonstrate mastery of each objective. Mastery grading puts emphasis on learning, provides clarity for students, and encourages perseverance and growth mindset.

9. PRIMUS has an issue devoted to MBG (Link Coming). Searching PRIMUS results is a large number of articles on MBG (Link to PRIMUS). Link to twitter feed with articles and titles you can find via PRIMUS (Link)

10. Some excellent education communicators in Math about MBG are on twitter.
    a. David Clark, GVSU, @dccmath
    b. Kate Owens, College of Charleston @katemath
    c. Sharona Krinsky, CSULA, @SouthBaySharona

11. Book "Specifications Grading: Restoring Rigor, Motivating Students, and Saving Faculty Time" by Linda Nilson (Link)

12. Stan Yoshinobu's Calc 2 standards based/mastery-based grading system. (This is for planting seeds for future virtual courses.) Syllabus (Link). Highlights provided here
    a. Assessment is based on WebAssign assignments for skills, quizzes every other week to delve into concepts and questions that require students to explain, and a final project. Students who want an A must complete the final project. Students who complete the WA and Quiz problem get a B+ and a sliding scale down for items not completed
    b. Summary table

B+	90%+ WebAssign HW, complete all quiz problems
B	90%+ WebAssign HW, complete 80%+ of all quiz problems
B-	90%+ WebAssign HW, complete 60%+ of all quiz problems
C+	90%+ WebAssign HW, complete 40%+ of all quiz problems
C	90%+ WebAssign HW, complete 25% of quiz problems
C- or lower	Complete less than 90% of WebAssign HW, and less than 25% of quiz problems on a sliding basis.
A/A-	Complete requirements for B, and submit a successful final project. Final project details to be shared later in the quarter.

    c. Key Parts to the SBG Grading System used in this example:

        i. The instructor **explicitly mentions the intrinsic value** of learning and that is the goal of the course. It provides an opportunity for students to become better thinkers. Students will need to know this material for their lives and careers, so cheating only makes them into frauds.

            "What will you do when you get to future courses or jobs and you don't know how to think or problem solve?"

            "What pride can you take in taking a taxi ride to the finish line of a marathon?"

            Instead this course is an opportunity to grow intellectually, emotionally, and morally.

        ii. Students can redo problems on HW and quizzes as many times as needed. This takes away most of the "high stakes" of test-based assessment and rewards those who buy in, by developing their virtues. This matches up with *Francis Su's* post linked above.

        iii. To get above a C, students will have to be able to explain their thinking and understand why.

        iv. With class activities and assessments aligned toward learning and providing students a clear path towards authentic success.

    d. Here's the class logo, symbolizing the three main goals of this term.

Math 142
Community Solidarity
Problem Solving
Growth Mindset
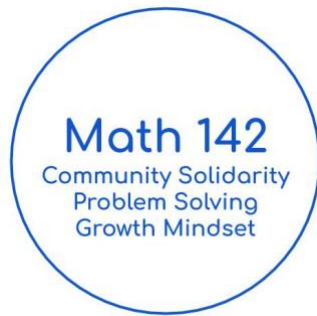
Francis Su's 7 Questions

Persistence: Take one homework problem you have worked on this semester that you struggled to understand and solve, and explain how the struggle itself was valuable. In the context of this question, describe the struggle and how you overcame the struggle. You might also discuss whether struggling built aspects of character in you (e.g. endurance, self-confidence, competence to solve new problems) and how these virtues might benefit you in later ventures.

Curiosity: What mathematical ideas are you curious to know more about as a result of taking this class? Give one example of a question about the material that you'd like to explore further, and describe why this is an interesting question to you.

Imagination: How has your mathematical imagination been enhanced as a result of taking this class? Give at least three examples.

Disposition toward beauty: Consider one mathematical idea from the course that you have found beautiful, and explain why it is beautiful to you. Your answer should: (1) explain the idea in a way that could be understood by a classmate who has taken classes X and Y but has not yet taken this class and (2) address how this beauty is similar to or different from other kinds of beauty that human beings encounter.

Creativity: Give one example of a mathematical idea from this class that you found creative, and explain what you find creative about it. For example, you can choose an instance of creativity you experienced in your own problem-solving, or something you witnessed in another person's definition or reasoning.

Strategization: For any problems you cannot solve on this exam, suggest a strategy you might try to tackle the problem, and show what happened as a result. Describe any strategic gaps you were unable to bridge, and list 3 helpful insights that may help another person trying to tackle the problem. Doing so will earn you up to 1/2 credit on the problem.

Thinking for Oneself: Choose one interesting problem from the text of medium difficulty that was not assigned. Describe why you find it interesting. Then either solve it, or find a solution online and work through it, using your own understanding to critique that solution and improve it. An alternative to this question might be: Write 10 true/false questions that illustrate a variety of ideas from this course that you might put on this exam if you were teaching the class. Give a key, explain the answers, then explain why you chose these particular questions and what you hope they will assess.

(Comments, Grading) I teach mathematics at the college level, so you may have to adapt these questions to your own context and grade level. But these types of questions are appropriate at any grade level. You might be wondering now: how to grade such questions. I encourage you not to spend too much effort wrestling with that. The notes with each question suggest a natural rubric (e.g., 'describe 3 examples...') and I'd suggest, and announce, that you'll give full marks for very thoughtful answers where mathematics is correctly described.