Math Reform Update

Daniel Archer
Vice President for Academic Affairs
September 15, 2023

Kansas Board of Regents
Building a Future for Kansas Families, Businesses and the Economy
<table>
<thead>
<tr>
<th>1. Welcome and Introductions</th>
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<tr>
<td>• 2:00-2:01</td>
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<td>Daniel Archer, KBOR</td>
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<th>2. Kansas Overview: Math Pathways, Corequisite Remediation, &amp; Course Placement</th>
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<th>3. Questions About Math Reform KBOR</th>
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<th>4. Georgia Overview: Coreq &amp; Course Placement</th>
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<td>Jonathan Hull, USG</td>
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<th>5. Georgia Questions</th>
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<td>• 3:00-3:10</td>
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<td>Jonathan Hull, USG</td>
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<th>6. Breakout</th>
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<td>• 3:10-3:30</td>
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<td>Breakout by <strong>Institutional Peers</strong></td>
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<tr>
<td>• What changes will your institutions need to make to implement math pathways by Fall 2026?</td>
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<td>• What challenges do you envision with implementing math pathways?</td>
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<th>7. Report Out</th>
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<th>8. Wrap Up</th>
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<td>Daniel Archer, KBOR</td>
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Math Reform

Math Reform Wave
Math reform has been one of the most significant common undergraduate level changes in higher education.

Future Council
Higher Ed
#1 and #2 recommendations were corequisite and math pathways.

KBOR Strategic Plan:
Building a Future
Implement proven practices that remove barriers and advance access, affordability, success, & completion.

Council of Presidents
Expressed strong interest in math reform.
Math Pathways
Math Pathways

Most Majors

16,761 students enrolled in College Algebra in AY 21 at Kansas Public Colleges & Universities.
Background
1. College Algebra was created to prepare students for Calculus.

Who Needs It
1. Today’s Reality: Only 20% of Majors require calculus

Enrollment
1. College Algebra is the third highest enrolled course in the system.
   16,761 students enrolled in College Algebra in AY 21
Most Majors

16,761 students enrolled in College Algebra in AY 21 at Kansas Public Colleges & Universities.
Math Pathways

- Statistics
- Quantitative Reasoning
- College Algebra

Majors Requiring Calculus
20% of All Majors
Math Survey to Identify Critical Math Skills

- Worked with the Dana Center at the University of Texas at Austin to develop a survey
  - What are the math skills that are critical for various disciplines?
  - Survey included college algebra skills, statistics skills, and quantitative reasoning (contemporary math) skills
  - Open for 3.5 weeks
Percentage of University Social Science Respondents that Noted a Math Skill as Being Critical

- Collecting Data: 95%
- Confidence Intervals: 73%
- Descriptive Statistics: 95%
- Normal Distribution: 91%
- Hypothesis Tests: 70%
- Linear Regression: 80%
- Probability: 86%
- Quantitative Statistics: 89%
- Random Sampling: 86%

Other skills with their respective percentages:
- Absolute Value: 41%
- Exponential Functions: 39%
- Function Theory: 9%
- Graphing Functions: 59%
- Logarithmic Functions: 11%
- Polynomial Functions: 16%
- Quadratic Functions: 11%
- Rational Function: 9%
- Probability Distribution: 9%

Percentage values range from 0% to 100%.
Percentage of Arts & Humanities Respondents that Noted a Math Skill as Being Critical

- **Absolute Value**: 21%
- **Exponential Functions**: 12%
- **Function Theory**: 13%
- **Graphing Functions**: 28%
- **Logarithmic Function**: 4%
- **Matrices**: 2%
- **Polynomial Functions**: 10%
- **Quadratic Functions**: 7%
- **Rational Functions**: 5%
- **Argumentation and Logic**: 72%
- **Financial Math**: 61%
- **Measurement**: 74%
- **Modeling with Probability**: 45%
- **Number Sense**: 87%
- **Proportional Reasoning**: 72%
- **Social Issue Mathematics**: 46%
- **Statistical Reasoning**: 69%
Math Pathways  Associate of Applied Science Degrees

Technical Math

OR

One of the Following

Quantitative Reasoning

Statistics

College Algebra

Majors Requiring Calculus
20% of All Majors
Corequisite Remediation
Gateway Math Enrollment

Does the Student Meet One of the Following?

1) A Systemwide Course Placement Measure Required for the Gateway Math Course Associated with Their Major; OR
2) Institutionally Designated Course Placement Measure Required for the Gateway Math Course Associated with Their Major.

Yes

The Student is Eligible for the Gateway Math Course Section.

No

The Student Enrolls in the Gateway Math Course Section.

The Student Enrolls in a Corequisite Support Math Developmental Education Section.
Section Models

(1) Supplemental course section
- A student in a supplemental course section attends a corequisite support developmental education section model in which there are structured courses that run before, after, or on opposite days to the gateway course. The gateway course and the concurrent supplemental course are completed in the same semester.

(2) Mandatory tutoring section
- A student in a mandatory tutoring section attends a corequisite support developmental education section model in which mandatory tutoring in a lab is required for a specified number of hours per week. The gateway course and concurrent mandatory tutoring are completed in the same semester.
Section Models

(3) Boot camp section
• A student in a boot camp section attends a corequisite support developmental education section model in which the first three to five weeks of the semester are typically developmental content, followed by the college-level content. Classes meet extra hours each week throughout the semester to equal the two classes or class plus lab. The boot camp and gateway course are completed in the same semester.

(4) Compressed course section
• A student in a compressed course section attends a corequisite support developmental education section model in which a developmental class is typically compressed into eight weeks, and then the college-level gateway course is typically compressed into eight weeks, so that both classes are completed in the same semester. Classes meet extra hours each week throughout the semester to deliver the applicable credit hours of instruction for both the corequisite section and the gateway course within the compressed timeframes.
Course Placement
Course Placement

- High School GPA and/or grades in certain high school courses have shown to be a better predictor than standardized tests.
- Most institutions are using the high school record for course placement purposes in math.
- The course placement standards for College Algebra vary.
Common question from a high school counselor: What is required to enroll in college algebra?

Up to 32 Different Standards
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<th>Year of Activity</th>
<th>Project Steps</th>
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| **AY 24**  
• Fall 23-Spring 24 | **Professional Development and Preparation**  
• Revisiting SWT Statistics and Contemporary Math Course Student Learning Outcomes on October 6, 2023.  
• Finish Aligning Math Pathways  
• Creating Systemwide Course Placement Standards |
| **AY 25**  
• Fall 24-Spring 25 | **Course Development and Preparation**  
• KBOR-Sponsored Professional Development  
• Institutions design corequisite support sections  
• Institutions design math pathway courses (as needed) |
| **AY 26**  
• Fall 25-Spring 26 | **Soft Launch**  
• Offer at least one section of each gateway math course that applies to degrees on its campus for Fall 2025 and Spring 2026  
• Offer at least one section of corequisite math support developmental education for each gateway math course that applies to degrees on its campus for Fall 2025 and Spring 2026. |
| **AY 27**  
• Fall 26-Spring 27 | **Full-Scale**  
• Use Systemwide Course Placement Measures  
• Full Scale Corequisite Math Remediation  
• Full Scale Math Pathways |