

Supporting Student Success in Math J010: Incorporation of Scaffolded Notes and Homework

What is Math J010?

Math J010 is a summer mathematics course offered as part of the summer **Groups Scholars Program**. Math J010 is a remedial course that covers much of the content students were first exposed to in Pre-Algebra. Topics that are covered include operations on integers and rational numbers, exponents, evaluating algebraic expressions, and translating English statements into algebraic equations. Students in Math J010 compute all calculations by hand, without the aid of a calculator.

Groups Scholars Program

The Groups Scholars Program was established to increase Indiana University college attendance among first-generation students and those with socioeconomic barriers. The Groups Scholars Program provides academic, financial, and social support to selected underrepresented Indiana college students from matriculation to graduation and beyond. Students who are admitted as Groups Scholars spend a little over six weeks during the summer before their freshman year living on campus and taking courses while being introduced to the campus and establishing a network of social and academic support.

Who takes Math J010?

Groups Scholars are placed into Math J010 based on their ALEKS placement scores. If a student does not score high enough to go directly into their credit bearing mathematics course, they are required to take Math J010. Students that successfully complete Math J010 can go on to take Math M106 or Math J111 in the fall, depending on the requirements for their major.

Differences in Summer 2024

Summer 2024 had many different characteristics than previous years:

- Two faculty led sections – no graduate student instructors
- Fewer than ten students in each section
- Highly integrated and engaged PASS leader
- Introduction of scaffolded notes and homework for first half of course
- Introduction of summary/review template for both exams

➤ Groups staff believed the lower number of Math J010 students in Summer 2024 was due to the placement exam being administered with more reliability and that students' scores were more accurately aligned with their skills.

➤ The PASS (Peer Assisted Study Session – link in references) leader for Math J010 in Summer 2024 led PASS sessions and attended most class sessions. Students in Math J010 are required to attend two PASS sessions each week in addition to their regular class time. We incorporated the review template as part of those PASS sessions.

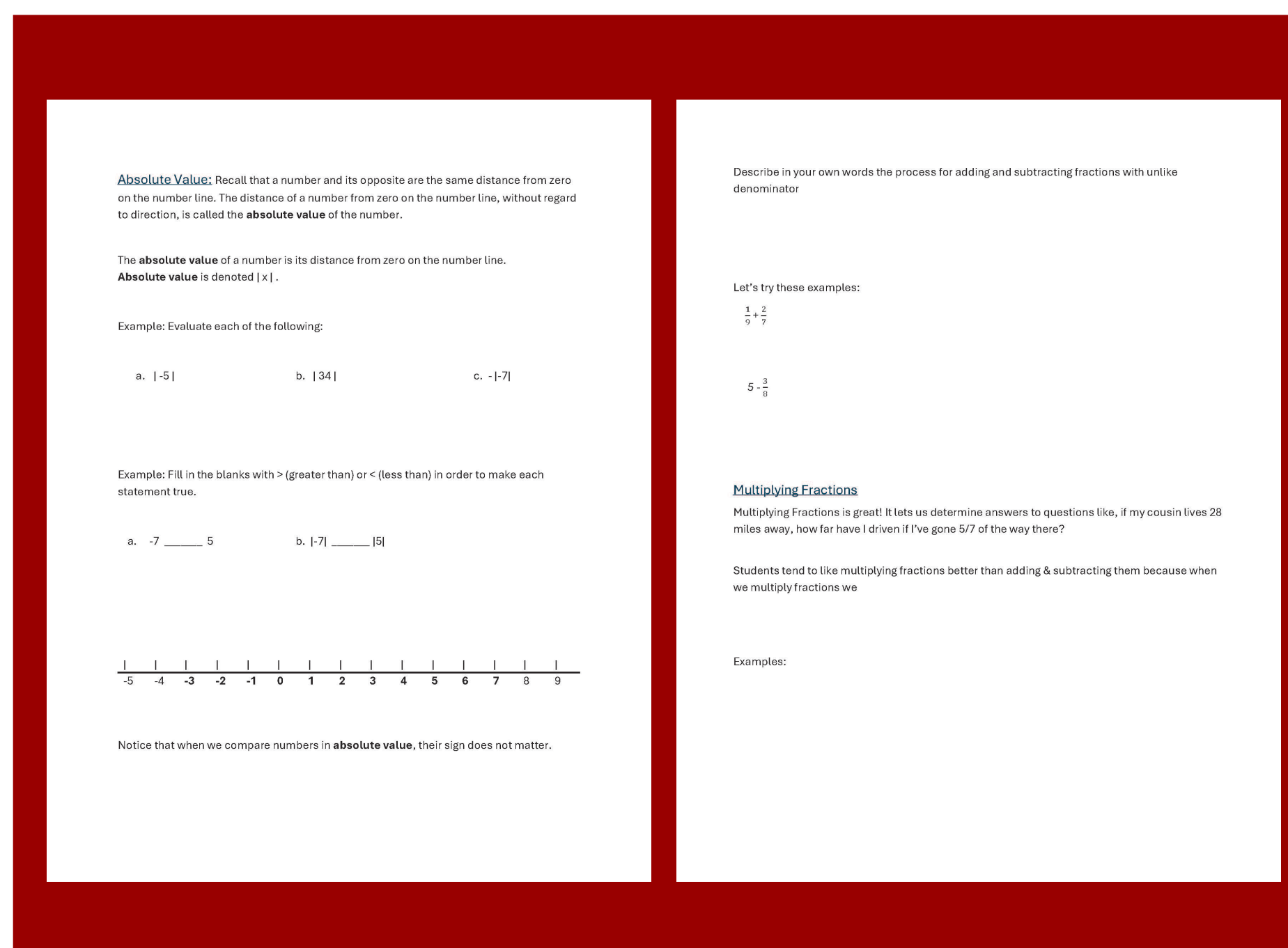


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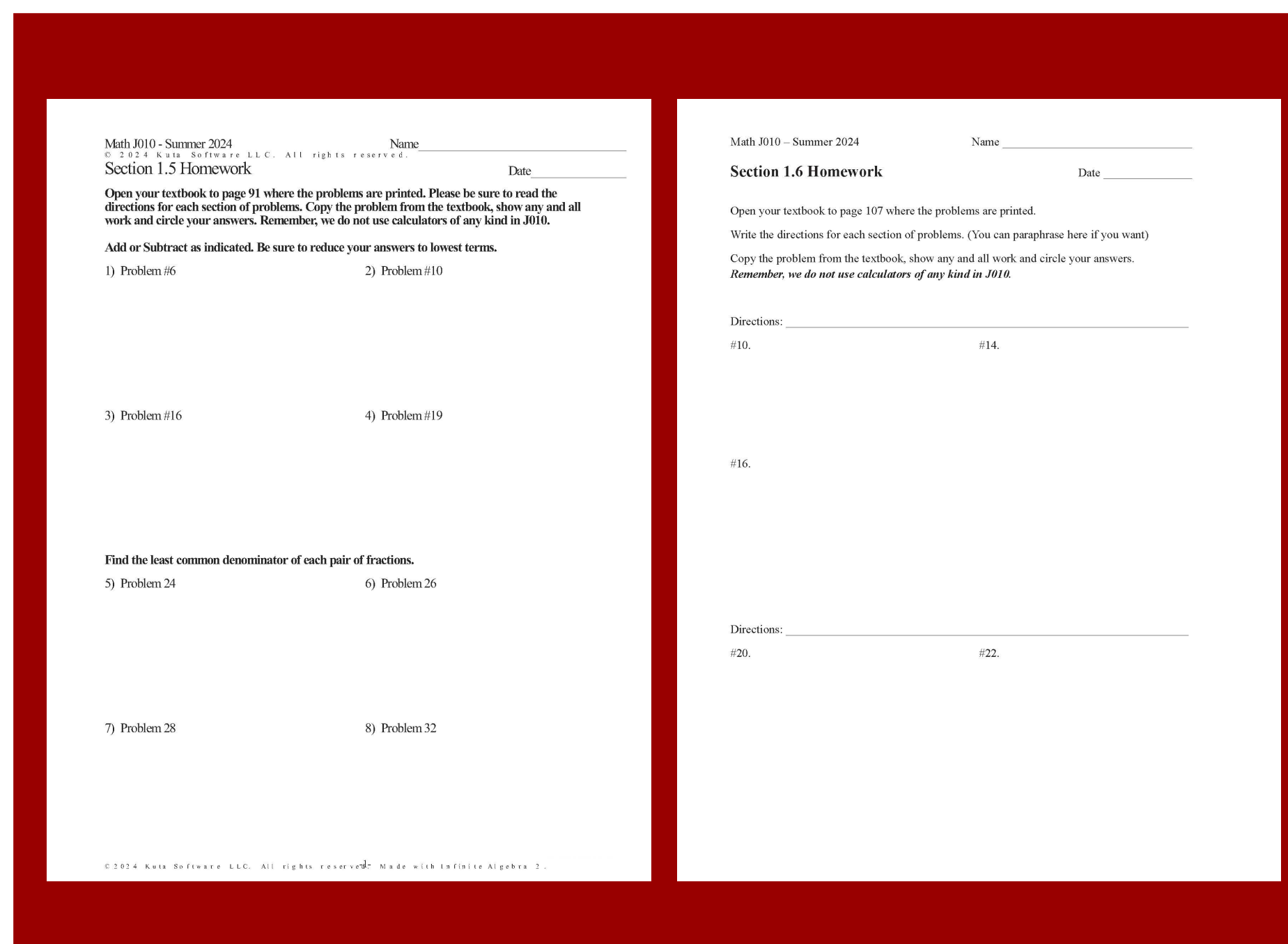
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Strategies & Tools Incorporated in Summer 2024

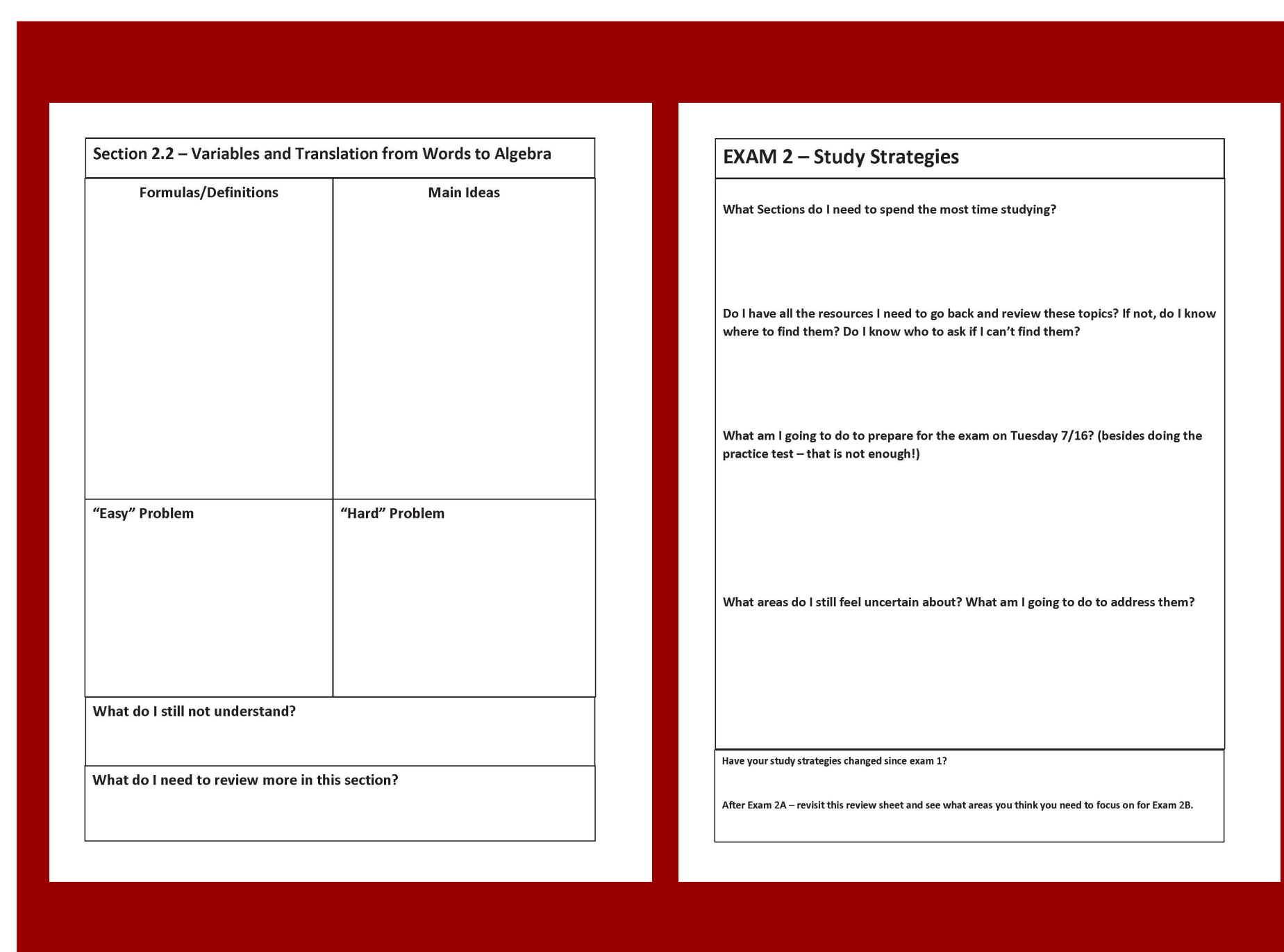
Guided & Skeleton Notes



Homework Assignments



Review Template



"I've learned not to be insecure about something I need a little extra help with. Your classroom was a safe space, I was never uncomfortable and enjoyed how you not only taught us things but engaged with us." ~Summer 2024 Math J010 Student

References



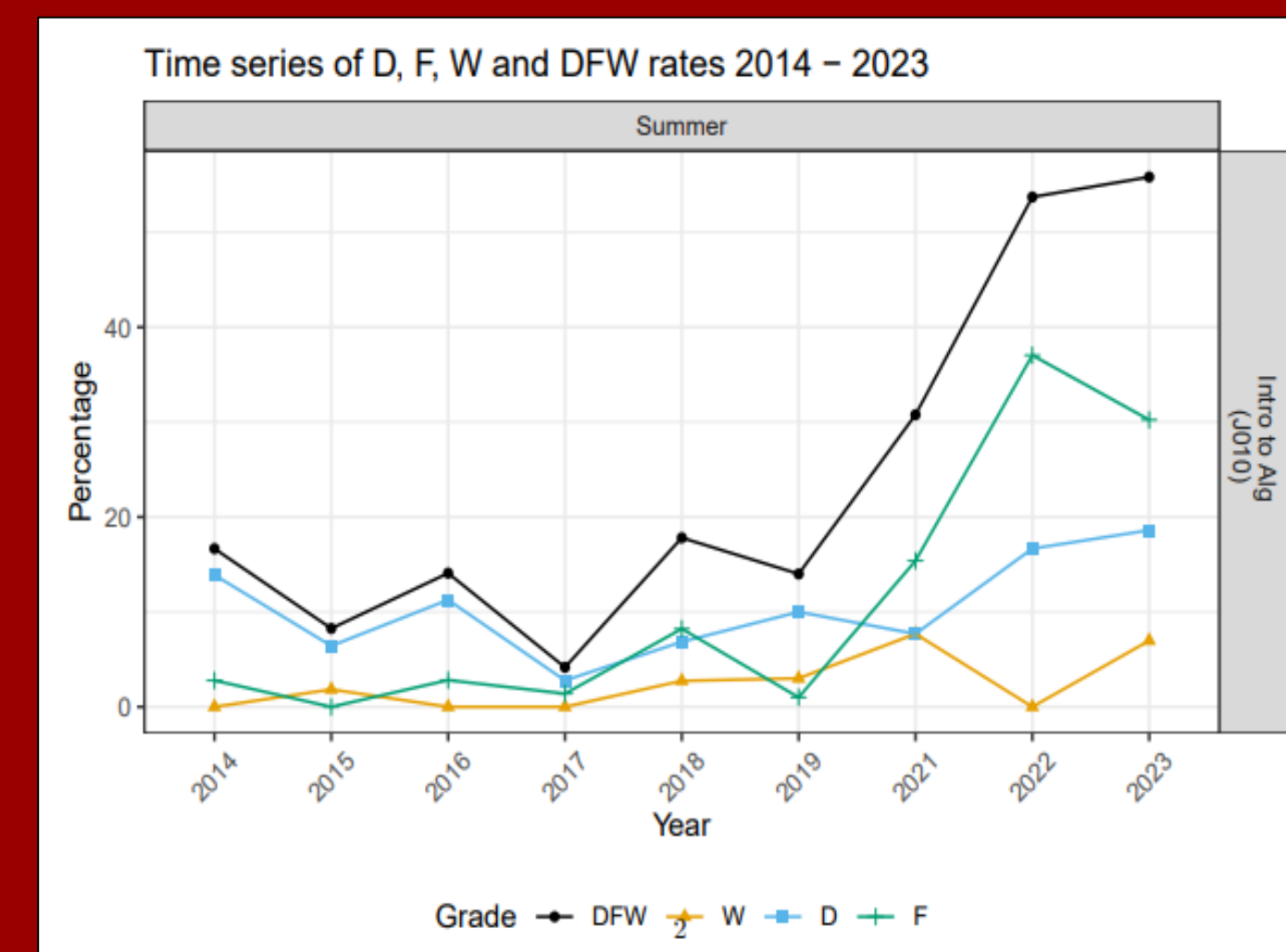
Overview

- Students that take J010 often have negative prior experiences in mathematics. Our goal was to deliver the curriculum in a growth-mindset, supportive and encouraging environment that would help them find success and a firm footing to start their collegiate journey.
- Scaffolded notes and homework were used for the first half of the course. Notes gradually morphed from complete → guided → skeleton → student notes. Similarly, the homework transitioned from what looked like typical math worksheets to templates to help students organize and describe their work.
- We provided these supports and explained their design and purpose as tools to help them develop strong academic habits. This transparency and intention resulted in the students using them and being able to transition to authoring their own organized notes and homework once the scaffold was removed.
- In addition, we provided the students with a review template that was completed in their PASS sessions. These templates helped them not only organize and summarize the material, but included guiding questions for study strategies they would use in preparing for the exam(s).

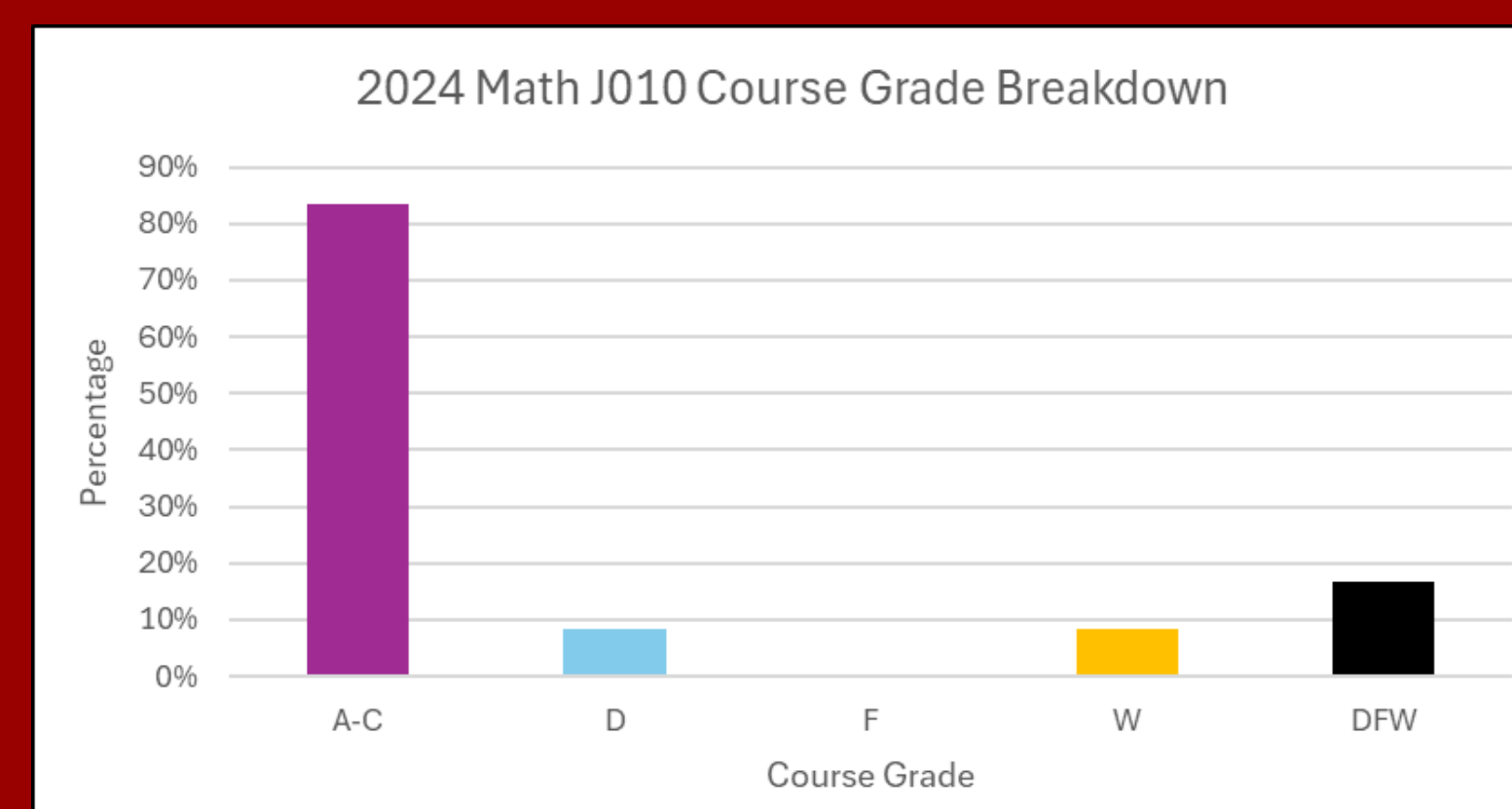
Student Success in Math J010: 2024 vs. prior years

While course grades are certainly not the only measure of student success, they do provide interesting and important data.

2014 – 2023 DFW Rates for Math J010



2024 DFW Data for Math J010



*the student who withdrew left the Groups program entirely, not only Math J010

Metacognition

A critical piece of a student's transition to college is their increased responsibility for directing their own learning (Stanton et al., 2021). Many arrive devoid of this skill, having not been taught to think or learn independently (Peter, 2012) and rarely develop this type of self-regulation without support. Lovett (2023) posits that many students can be successful in high school without having developed effective strategies for learning and stresses to post-secondary instructors that "metacognitive skills are critical, and they are more likely to be learned when they are integral to our instructional strategy" (p.39). Students' metacognitive skills are vital because they allow students to become aware of their personal style of learning and can help them recognize, implement and improve strategies (Su et al., 2016).

Scaffolding

The Encyclopedia of Mathematics Education (2020) describes scaffolding as "an intentional support system based on purposive interactions with more competent others". Scaffolding instruction onto students' previous learning experiences has been shown to be effective in teaching marginalized students mathematics (Herbel-Eisenmann, 2012, p.31) as well as providing students with explicit instruction in goal setting, strategic-planning and self-recording (Cohen, 2012). "It is important for instructors to help students learn how to self-regulate, and adequately assess what it is they know and do not know" (Cohen, 2012, p.900). Mathematics instruction should help prepare students to become learners, interpreters and users of mathematics (Schoenfeld, 2016) that understand "how to think through math" (Su et al, 2016) rather than to memorize formulas and repeat non-connected processes.

Growth Mindset & Culturally Relevant Pedagogy

Culturally relevant teaching involves relationship building with students and encouraging a community of learners who both teach and learn from each other (Ladson-Billings, 2022). By fostering a comfortable, safe, welcoming classroom environment, instructors can create spaces where students not only learn, but make mistakes, ask questions and help one another. Helping students understand and believe that their intelligence is not fixed and that with the right teaching and messages, everyone can be successful in math supports a growth mindset (Boaler, 2016). It is important that instructors not only present content well but also emphasize, and believe in, each student's ability to learn and grow. "It is *the way we teach* that profoundly affects the way that students perceive the content of the curriculum" (Ladson-Billings, 2022, p. 15).

Conclusions

Based on course grades, students that took J010 in Summer 2024 were more successful as a group than their predecessors. No student failed the course and only one withdrew (leaving the Groups program entirely).

The classroom environments were welcoming, inclusive and supportive. There were no attendance issues in class or PASS during summer 2024 and the overall course average was 86.3% which highlights the time, effort and work the students put into the course.

The supports we introduced helped students build academic practices they can carry forward into their future coursework and beyond.