

Navigating TJ Math Panel

December 8, 2017, 10:30-11:45

Moderator

Marilena Barletta, PTSA 1st Vice President

Panelists

Marianne Razzino - Division Manager, Math & Computer Science;

AB Calculus team leader MPRazzino@fcps.edu

Isaac Carey – Assistant Division Manager; RS 1 team leader ijcarey@fcps.edu

David Hill - Math 3 team leader dlhill2@fcps.edu

Karilee Schmitt - Math 4/5 team leader KRSchmitt@fcps.edu

Mike Auerbach - BC Calculus team leader MLAuerbach@fcps.edu

Myra Spoden – Multi/Linear team leader msspoden@fcps.edu

Three of the panelists – Marianne Razzino, Karilee Schmitt, and Mike Auerbach – are themselves TJ graduates!

General Announcements

1. Freshmen parents should receive an email early the week of December 11 with the results of the diagnostic test and placement recommendations for second semester.
2. The issue of Math 4 credit has finally been fixed. Students who finished Algebra 2 before coming to TJ will get their half-credit for taking Math 4. Those currently in Math 4 will also get credit – it may take slightly longer for the credit to show up on reports, but all students WILL get credit for taking TJ Math 4.
3. Curriculum Night for parents is coming back!! The exact date is TBD, but it will be sometime in January, before course selection. For students, there will be a Curriculum Fair on February 2 during 8th period; at this fair, students will be able to learn about all the courses available to them for the coming year.

Math Department Course Sequencing

Marianne Razzino explained course sequencing in the math department, along with some background. TJ math courses were redesigned five years ago – that was when FCPS approved the re-design. One of the main reasons behind the redesign was so TJ could add in a semester of statistics, Research Statistics 1.

Here is the list of courses in sequence:

1. RS 1 - All first semester freshmen take this course. They use the skills and information from this course not only in IBET, but in future science and math classes.
2. Then, for second semester freshmen year, the next course depends, both on what your child took in middle school and on the results of a diagnostic test given in the first semester. Here are the options:

Math 1 or 2 – this is equivalent to Honors Geometry

Math 2.5 – see below for details

Math 3 – essentially Algebra 2 Honors (no statistics, which is covered in RS 1, or trig, which is covered in TJ Math 4)

some freshmen qualify to take Math 4 or 5

3. Next, (after Math 3) Math 4 and 5 – Precalculus Honors; most take these courses sophomore year.

4. The next course is Calculus, either AP AB or BC Calc — these are the only full-year math classes at TJ. Calculus is the math graduation requirement; once this requirement has been met, students can then do what they want.

5. After BC Calculus, there is a whole array of upper-level courses; all are college-level and semester-long classes. These courses are:

Multivariable Calculus

Linear Algebra

Probability Theory

Advanced Mathematical Techniques

Concrete Math

Complex Variables

Differential Equations

Cryptography (only requires TJ Math 4/5)

Research Statistics 2 (only requires TJ Math 4/5; completes AP Statistics)

What is Math 2.5 and What is the Sequence for Those Who Take It?

Math 2.5 is for those students who need a little extra background in 21st century skills — this course provides extra transition assistance for those students who need it, rather than having them go directly into Math 3, a challenging course. In the coming second semester, Isaac Carey and David Hill will be the two teachers for Math 2.5.

For those who take Math 2.5 in second semester freshmen year, course sequencing can take several paths:

1. Math 3 and 4 sophomore year, then Math 5 in the fall of junior year. For the spring of junior year, a student can take either Math 6 (a bridge to Calculus), or Cryptography, or RS2, or no math. Then senior year, a student can take Calculus.

2. The alternate path, less recommended, is instead of taking Math 5 in the fall of junior year, to take it during the summer before junior year, so that the student can take Calculus in junior year. The downside of that is that the student must master Math 5 in the two and a half weeks that a semester course lasts in the summer.

Testing – Difficulty of tests, grading, etc.

There were numerous questions submitted by parents about testing. Many of them revolved around a couple of themes: the class average on a number of tests seems to be very low (the first test of the year for Math 4 and BC Calc were particularly mentioned) – why does this happen? Doesn't that mean there is something wrong with

the test, rather than the students? Another question concerned the types of problems on tests, that they seemed to be too hard, i.e., with problems that were not reviewed in class or in the homework; and that there was not enough time to complete the test because of the difficulty of the problems. Some parents felt that the difficulty and low grades (despite great effort) were affecting their kids' love of math.

Ms. Razzino started the testing topic by saying that all six of the panelists are team leaders and they have all made tests and have wrestled with these issues. What is the purpose of testing? They test to see if the students know the content, and have learned how to do it in an efficient manner. TJ math courses are Honors level + courses, and they try to go deep, as well as fast, in the courses.

For the homework assignments, the kids are not asked to do, for example, problems 1-75. The students should choose among the problems, and try a variety. When it's time for the test, students should find a problem they haven't done and work on it; if they cannot work it out, they can come and ask the teacher.

There will be a small part of every test where the students are asked to apply their knowledge.

Isaac Carey, the team leader for Research Statistics, said that he writes all the research stat tests that "torture the freshmen." Those tests are made fresh every year. The upside of new tests is that that means the students get to keep all their tests and can do test corrections. The downside is that that introduces variability in the tests – they can be more or less difficult each time, the timing can be different, etc.

The freshmen have two challenges to get used to. First, the freshmen mostly destroyed middle school math, it was very easy for them, and now it's different; they are much more likely to be among their academic equals at TJ, no longer the smartest in the room. Second, they need to learn to approach tests differently than they did in middle school; they need to learn test-taking skills. Among these skills is that they should learn to read through the whole test first, before starting it – not just start at the beginning and then continue one by one. They also need to learn how to review for the test better.

Moving on to the question about tests with a low class average, Marianne Razzino said that she would love it if everyone would get 100%, but they also don't want the tests to be a cakewalk. The math teams have a basket of approaches when there is a low average on an assessment. They do notice when a whole bunch of students misses a particular problem or part of a test. They will go over those problems in class. Some of the mistakes are more individual — the teachers will provide the opportunities for test corrections, for example in 8th period block. A student can also ask for assistance during 8th period from a different teacher, who might explain it differently and/or better.

If there is a test where the majority of the class bombs it, then the math team might do a bonus quiz or assignment — this is about allowing students to show that they have learned the material. There will be time in class for that also.

Karilee Schmitt, the Math 4 team leader, addressed the Math 4 test from earlier this year specifically – there were a lot of problems that a lot of students got wrong. The Math 4 team then sat down to look at the test and figure out what went wrong. The team found that there wasn't anything per se that was too hard, individually, but instead that there were too many challenging problems, and therefore many students ran out of time. This first Math 4 test was the first time that the students have faced Trig problems, and these are challenging. In this case, the teachers decided to use the Bonus quiz option and discussed the test in class.

The math teams are trying to adjust the timing of the tests better. They have told the kids not to get stuck on one question — don't go problem by problem from the beginning — look at the test as a whole first — if you can't solve a problem, skip it, and go to the next.

David Hill, the Math 3 team leader, said that usually the freshmen do fine in RS 1, and that the first course where they will be challenged mathematically is Math 3. It is often the first time where the kids have to not only learn the skills but apply them. When the teachers design the tests, they focus on what the kids should and need to know.

Mr. Hill continued, we should do our best not to focus on the points. We want the kids to get the problems and concepts, but we need to have accountability, too. We're pushing them to grow intellectually. If they run into an obstacle, they can come talk to the teacher and work on it. This is the hardest math they've ever done up to this point — it is nothing like middle school math.

Isaac Carey said that test corrections are a 3-step process: first, they need to identify what they did wrong? — a student needs to be cognitively engaged and reflect on what he or she did wrong; the second step is to then correct that problem; and the third step is for the student to cite where he or she has seen a problem like that before — in the homework, in the text, etc.

The students need to become aware of why they made the mistake – was it a careless mistake? Did they not really prepare and do their homework? Did they do the problem and homework but not actually check the problem and answer sheets? Or did they do the homework and problems correctly but then never went back to review them? The bonus of doing the test corrections is that the student will then have an individualized study guide for the cumulative exam.

Ms. Razzino pointed out that the kids can also go to Blackboard and get a new packet of notes.

Mike Auerbach, who writes the tests for BC Calc, said that he felt that he needed to change 20% of the tests in previous years, but that this year, he's refreshing 80% of the tests. The teachers do believe in giving back the tests, but then so many students share the tests, that they have to do more re-writing, which increases the variability. For example, in BC Calc, there have been four tests so far this year, and they've had to curve two of them. His goal in writing the test is for 15%-20% of the test to be something that they haven't seen before — the students need to be able to do more than parrot back what they've learned. Good students will get about half those points (great students will get all of them). However, the rest of the test is very similar to what they've done in class or homework and they should be able to get those points.

Ms. Razzino added that they ramp up the skills as the kids go up in math levels; in the lower level courses, they start with just a few extra problems; they try to build the skills as they increase the levels. During freshman year, the tests are more transparent — the kids can't really make those connections at this level.

Myra Spoden added that in one of the BC Calc tests that Mr. Auerbach referred to, they found that algebra skills caused some of the students problems (for about 25% of the students), so they started an 8th period algebra skills review with Mr. Auerbach.

Marilena said that several of the parent questions were about why there are concepts tested on the assessments that were not taught in class.

Marianne Razzino said that they have heard this type of question before and that they have talked about this with their leadership team and they honestly do not think this is happening — they would love to know where this is occurring and where this idea is coming from. Pam Gravitte, Assistant Principal and Department Administrator for Math and Computer Science, would also welcome that.

Although as mentioned, the tests are designed to contain questions which require the students to apply their knowledge and skills, the teachers do not consider these problems to be “new material.”

The tests across a class are very similar no matter the teacher — the department uses that information to make sure that all the teachers are getting similar results and that there are team norms.

Mr. Carey urges parents to email them if what they're saying is not aligning to what parents are hearing from their students.

The “love of math” issue

David Hill said that a love for something should not be jeopardized by being challenged. For example, he loves basketball and math. Regarding basketball, he will never be very good at it, let alone a professional, but that does not stop him from playing and enjoying it. When he hears students say that they don't love math any more, he asks them: do you not like it because you're not getting an A, or do you not like trying to learn how to solve the problems? Would you enjoy solving the problem if you didn't have to worry about the points and the grade? Most say yes.

We need to get the stress out of the picture, and try to teach the students test skills, continue to challenge them, and get them to panic less. Whether the kids loves math, and whether they don't love not getting As, are two separate questions.

Isaac Carey added that they don't write tests to torture the kids – wait until the first Math 3 test in February – a healthy level of stress is fine, but your identity and ego should not be tied to your grades. Mike Auerbach added that the kids should get away from the idea of needing to be the smartest kid in the school.

Marianne Razzino said that it's o.k. to not love math – in her case, she first pursued architecture at university, but she found that although she loved architecture, she did not like studying to be an architect. Math is learning skills that you can apply to other things so you can solve problems and be a critical thinker. A lot of kids learn that they don't want to be mathematicians – she didn't either — what she wanted to be was a math teacher.

Who's helping the kids when they fall on their faces?

Ms. Razzino said that they are still there when the kids fall on their faces — they're here in 8th period, etc. TJ's counselors do work with the 9th graders on advocacy. And the teachers want to have these conversations – with both students and parents – they really do.

Mr. Carey said that parents should talk to their kids about advocacy, but that the teachers do realize that they can be intimidating to the kids. If parents feel that their kid is too shy or intimidated to email or otherwise contact the teacher, then parents should feel welcome to email him, or another teacher or counselor, on their kids' behalf — the teachers will respond.