Improving Student Performance on the MME Test

ACT, WorkKeys, and Michigan Mathematics Subtests

This listing was generated by participants at the MCISD's "MME for Teachers" professional development session on December 4, 2007. Many thanks go to the participating teachers for providing these ideas and the rich discussion during the evening.

Many, if not most, of these suggestions can be implemented right with the regular day-to-day curriculum and lessons. It would also help if teachers of 9th and 10th grade mathematics courses would implement at least some of these suggestions. It's much harder to leave this all to the Junior year.

GENERAL SUGGESTIONS:

1) Students may use calculators for the MME mathematics tests. Be sure students are fluent in using their calculators to solve applied problems as well as algebra/geometry problems. Be sure they know how to use any fraction and percent features available. Be sure they can use any probability and statistics features available.
2) One of our districts ensures students have a calculator available for the tests by having a table in the morning at which students can pick up a graphing calculator prior to the test (they sign one out). Great idea!
3) If your school doesn't have enough calculators for all students testing, borrow from your middle schools (and elementary schools, if needed).
4) Make sure students know their Pythagorean Triples and how to scale them and recognize them; their special right triangles and how to use their properties; their perfect squares 0 – 30 squared (saves lots of time).
5) Ensure that special education students have access to calculator technology and to the high school mathematics content. If necessary, bring in a graphing calculator "expert" (check your ISD or high school colleagues) to teach students (and teachers) how to use graphing calculator technology. Ditto, bring in a mathematics teacher to kick off or extend lessons on key mathematics content with the special education students.
6) Explore ways to co-teach special education mathematics classes.
7) Find ways to provide content area PD for special education teachers.
8) Include reading informational text in your math classes – find science and social studies articles in the newspaper or in journals, and read these in math class. Include articles with data (graphs, statistics, probability statements), and analyze how to read and interpret these graphs; see if the context of the article and the conclusions drawn mesh with the class's interpretation and conclusions. Especially look at analyzing concepts like increasing, decreasing, rates of change, skewness, misleading graphs, initial perceptions vs. what the table/graph is really saying upon further analysis.
9) Present class data frequently and in a variety of forms – quiz and test scores, homework completion rates by assignment, one class hour's data compared to another hour's data, etc.

IMPROVING WORKKEYS PERFORMANCE IDEAS

1) Give students the WorkKeys Formula Sheet early in the school year. Provide them problems and opportunities to use the formula sheet frequently before the MME, so that they are familiar with the sheet. You can find this formula sheet at: http://www.act.org/workkeys/assess/math/formulas.html and printing them off or saving them in a PDF are options.
2) During the school year, allow some time for practice tests modeled after the WorkKeys questions. If you need information on the kids of questions asked, please see: http://www.act.org/workkeys/assess/math/levels.html. Sample items are at:

http://www.act.org/workkeys/assess/math/sample3.html . Have at least some of these practice runs be under timed conditions. Teachers wouldn't need to run a full mock test – just 10 problems or so at a time for starters should be easy to fit in to class time periodically.

3) Allow students to work in pairs or groups periodically to solve practice problems. Also, have students in pairs and groups write some of their own applied math questions.
4) REGARDLESS of the mathematics courses your Juniors are taking, review basic arithmetic skills with them, even those taking Trig, Precalculus, and Calculus. Students should know how to perform the basic 4 operations on whole numbers, integers, fractions, decimals, percents; they should know how to find perimeter/circumference, area, surface area, and volume of real-world items (gardens, pools, yards, parking lots, boxes). Finding sales tax, discounts, mark-ups, commissions, and combinations of these are also needed. Students should have opportunities to practice with AND without their calculators.
5) Include WorkKeys-style problems as class openers/closers frequently.

ACT IMPROVEMENT STRATEGIES

1) If possible, have a class for ALL Juniors for test preparation (1st semester/1st (and possibly 2nd) trimester). The class would enable students to become savvy test takers, but would also give them the chance to review the content they can expect to see on the test. Students could focus on mathematics for, say, 6 weeks, reading/writing/social studies for 6 weeks, and science for 6 weeks (or whatever combo your school needs).
2) In mathematics, students really MUST know their formulas from general math (pre-algebra and before), algebra, probability/discrete math, and geometry. They should know how to derive these, so they can recreate them when needed, but if they can't do this, they at least could memorize the formulas and explain when and how to use them.
3) Whenever possible, make sure students know how to use the features of their graphing calculators to best tackle the various types of problems they'll see.
4) Focus on weak areas of the content as determined by looking at the 2007 MME reports, results of local common assessments, and other data sources. In our county, the geometry strand is our biggest issue.
5) Teach students how to READ applied and "naked" mathematics problems. ACT problems are often terse, concise, and precise. We tend to elaborate with our students in class. They need to know how to interpret mathematical language and symbols.
6) Ensure that students know the terminology and vocabulary. They need mathematical vocabulary and symbols, but they also need to know the surrounding terminology – verbs in the questions, qualifiers (all, some, not, always, never, approximately), "in terms of pi", "simplest radical form", etc.
7) Get or print for students copies of an ACT practice test (see: http://www.actstudent.org/sampletest/index.html for sample questions, and http://www.act.org/aap/pdf/preparing.pdf - full version of sample ACT). Use as class openers, closers. Have students work in pairs or groups to solve a few at a time. Do some practice tests similar to WorkKeys above. Mesh ACT-like questions into your curriculum as those topics appear.
8) If possible, have ACT Test Prep materials (books, such as those from Princeton, Kaplan, Barrons's, etc.) available at school and in any test-prep courses your school offers.

MICHIGAN MATHEMATICS PORTION

1) Make sure all students have seen at least the basics of probability and statistics RECENTLY prior to the test. Many students won't have worked with Probability or Statistics much since middle school.
2) Use graphing calculators to their advantage – they should at least know how to find the 5-number summary and how to interpret those values.
3) Probability and statistics problems make great warm-up problems and closure problems.
4) They're also great for days before a vacation day, or when transitioning between chapters/units.
5) They've got to know the vocabulary!

6) See General Suggestions #5 and #6
7) Be sure students understand the Fundamental Counting Principle, factorials, permutations and combinations (and which to use when), tree diagrams.