The SAT® Suite of Assessments
Math that Matters Most:
Passport to Advanced Math
Additional Topics in Math
The SAT® Suite of Assessments, one component of the College Board Readiness and Success System, comprises the PSAT® 8/9, PSAT® 10, PSAT/NMSQT®, and SAT®, and focuses on the few, durable skills that evidence shows matter most for college and career success. The tests included in the SAT Suite of Assessments are connected by the same underlying content continuum of knowledge and skills, providing schools with the ability to align vertical teams and create cross subject tasks.

The SAT Suite of Assessments is aligned with classroom instruction. At the College Board, we know that the best way to prepare students for college and career is through excellent instruction aligned with college and career ready content and skills, and we have the opportunity to support excellent instruction by designing assessments that measure the skills that matter most for college and career readiness. We are committed to partnering with teachers and school and district leaders to help students build the necessary skills that will ensure their success at their chosen college, university, or career training program.

The purpose of the Professional Development Modules for Educators is to build a deep understanding of the content and skills assessed on the SAT Suite of Assessments, and to support educators as they identify the natural points of alignment across the SAT Suite, classroom instruction, and curriculum. Each professional development module contains descriptions of the assessment content, sample questions, and suggestions for helping students master content and prepare for the assessments in the SAT Suite. The modules are flexible; they are designed for download and presentation in various meetings and professional development sessions, for individual or group use. The presentations can be viewed in one sitting or broken into shorter chunks over time. Each module suggests interactive activities for groups and teams, but the content can be reviewed by individuals. There is no one right way to engage in this professional development; it is our hope that individuals, schools, and districts will utilize the presentations and handouts in ways that maximize effectiveness in a variety of situations.

What’s in the Modules?
You have accessed Module 5 – Math that Matters Most: Passport to Advanced Math and Additional Topics in Math, which examines the content assessed in two subscores of the SAT Suite of Assessments. In the module, participants review the test specifications for the Math Test, and they review sample questions from the test. Additional modules include:

» Module 1 – Key Features
» Module 2 – Words in Context and Command of Evidence
» Module 3 – Expression of Ideas and Standard English Conventions
» Module 4 – Math that Matters Most: Heart of Algebra and Problem Solving and Data Analysis
» Module 6 – Using Scores and Reporting to Inform Instruction
» Module 7 – Connecting History/Social Studies Instruction with the SAT Suite of Assessments
» Module 8 – Connecting Science Instruction with the SAT Suite of Assessments
» Module 9 – The SAT Essay

Each module is independent and can be viewed alone, although we strongly recommend becoming familiar with Module 1 before reviewing any of the other modules.

What’s in this Facilitator Guide?
Each module is accompanied by a Facilitator’s Guide like this, which includes suggested discussion points, pacing guide, handouts and activities. Each Facilitator’s Guide lists the approximate length of time needed for each slide and activity. In addition, the guide suggests section breaks (chapters) to allow for a more succinct, targeted review of the content.

WE WANT TO HEAR ABOUT YOUR EXPERIENCE WITH THE MODULES!
Email SATInstructionalsupport@collegeboard.org and take the Exit Survey to share your feedback. © 2016 The College Board.
What Are the Suggestions for Module Presentations?

1. Review the complete Facilitator’s Guide with Handouts and the PowerPoint presentation to get familiar with the suggested talking points, activities, and handouts in the presentation.

2. Provide a paper or electronic copy of the PowerPoint presentation to all participants for personal review and note-taking.

3. Print or email all handouts at the end of this Facilitator’s Guide for each participant.

4. Review the suggested timing for each slide and activity, and choose activities that fit in the time frame allotted for your meeting.

5. Each module assumes a new group of participants is present. If the participants have engaged in other modules, a facilitator may adjust and remove content that is repetitive.

6. Please follow up each presentation with an email to participants that contains a link to the online exit survey. Your feedback is valuable and will be used to improve the modules!

What Are the Follow-Up Activities?

This professional development is meant to be a starting point. Modules 2 through 9 include suggestions for follow-up activities to continue the learning beyond the presentation. Look for suggestions at the end of each Facilitator’s Guide in Modules 2–9.

If you have questions, comments, or suggestions about the presentations, the materials, or the SAT Suite, please email SATInstructionalsupport@collegeboard.org for personalized attention. We look forward to hearing from you!
# Preparing Your Presentation for the Time Allocated*

<table>
<thead>
<tr>
<th>How Much Time Do You Have?</th>
<th>Use These Slides</th>
<th>Use These Activities</th>
<th>Use These Handouts (some handouts will be used without the accompanying activity)</th>
</tr>
</thead>
</table>
| 30 minutes                 | 1–15, 17–26, 34–38 | › Passport to Advanced Math Sample Question  
› Additional Topics in Math Sample Question  
› Questions for Reflection | 1. SAT Math Test Domains  
2. Instructional Strategies for SAT Math  
3. Sample SAT Math Questions  
4. Questions for Reflection |
| 60 minutes                 | 1–27, 34–38       | › SAT Math Test Domains Activity  
› Heart of Algebra Sample Question  
› Problem Solving and Data Analysis Sample Question  
› Sample SAT Math Questions  
› Questions for Reflection | 1. SAT Math Test Domains  
2. Instructional Strategies for SAT Math  
3. Sample SAT Math Questions  
4. Skill-building Strategies Brainstorming Guide  
5. Questions for Reflection |
| 90 minutes                 | All Slides        | › All Activities and Questions | All Handouts                                                                 |

*Please note: The time estimations are approximate and will be influenced by the engagement of participants and the pace of the facilitator.
**Suggested Discussion Points/Handouts/Activities**

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<th>SLIDE 1</th>
<th>ESTIMATED TIME (IN MINUTES):</th>
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Welcome to Module 5.
Suggested Discussion Points/Handouts/Activities

This is the fifth in a series of professional development modules. It is intended to be viewed after Module 1, which is an overview of the SAT. Remind participants that more information is available in other modules at collegereadiness.collegeboard.org
Suggested Discussion Points/Handouts/Activities

SLIDE 3 | ESTIMATED TIME (IN MINUTES): 1

Review the objectives (purpose) for Module 5.

What is the Purpose of Module 5?

- Review the content assessed for two math domains:
  - Passport to Advanced Math subscore
  - Additional Topics in Math
- Connect Passport to Advanced Math and Additional Topics in Math with classroom instruction in math and other subjects
Suggested Discussion Points/Handouts/Activities

SLIDE 4  ESTIMATED TIME (IN MINUTES): 2

Module 5 will help us look deeply into two subscores related to the Math Test, Passport to Advanced Math and Additional Topics in Math.

To build the connection between the SAT Suite of Assessments, classroom instruction, and college and career readiness, students and educators receive more scores than ever before. These scores provide more detailed information about students’ strengths and areas in which they need to strengthen their skills. Each box on this slide represents a score students receive when they take any assessment in the SAT Suite.

This is an important table for understanding the scores that are generated from the SAT Suite of Assessments. Direct participants’ attention to the three Test Scores in the middle of the table: Reading, Writing and Language, and Math. These are the tests students take.

Move to the second row, and note the two section scores: Evidence-Based Reading and Writing, and Math. Note that the two section scores are added together for one total score.

This table shows that the Evidence-Based Reading and Writing section score comprises both the Reading Test and the Writing and Language Test because they’re in the same column. The Math section score is in the same column as the Math Test, demonstrating that the Math section score is derived from the Math Test, but note that the scores are on a different scale.

In the middle, you’ll see that the cross-test scores, Analysis in Science and Analysis in History/Social Studies, are derived from all three tests.

At the bottom of the table are the seven subscores. The three subscores listed below Math are derived from the Math Test. Words in Context and Command of Evidence subscores are derived from the Reading Test and the Writing and Language Test, and the Expression of Ideas and Standard English Conventions subscores are derived from the Writing and Language Test only.

The optional SAT Essay is not factored in to these scores.
Suggested Discussion Points/Handouts/Activities

SLIDE 5  ESTIMATED TIME (IN MINUTES): 2

All of the tests in the SAT Suite of Assessments include the same score categories: total score, section scores, test scores, cross-test scores, and subscores. (Notable exceptions: only the SAT has Essay scores [optional for students], and the PSAT 8/9 does not have a subscore in Passport to Advanced Math.) In this Suite, by design, the assessments are created to cover a slightly different range of content complexity that increases from the PSAT 8/9 to PSAT 10 and from the PSAT/NMSQT to the SAT. This increase in content complexity also corresponds to an increase in the difficulty level of each test. As one could easily imagine, content on the PSAT/NMSQT is more difficult/challenging than content on the PSAT 8/9, and content on the SAT is more difficult than content on the PSAT/NMSQT. To support these differences in test difficulty, and to also support a common metric against which students can be measured over time, the total score, section scores, test scores and cross-test scores are vertically equated across the SAT, PSAT/NMSQT, PSAT 10, and PSAT 8/9. Vertical equating refers to a statistical procedure whereby tests designed to differ in difficulty are placed on a common metric. This allows the tests to function as a system where student performance over time can consistently be measured against a common metric, allowing us to show growth over time for a student (or at an aggregate).

The min-max scores vary from assessment to assessment to show the difference in complexity of knowledge on the different tests. Theoretically, if a student were to take the PSAT 8/9, PSAT 10, and SAT on the same day, they would score the same on each assessment, but if you scored “perfectly” on all three, you would only get a 720 versus an 800 for Math on the PSAT 8/9 versus the SAT — because the difficulty of questions is that much harder on the SAT.

To see how this plays out across the tests, we have summarized in the graphic on the slide the effect on Section Scores (the 200–800 score for Math and Evidence-Based Reading and Writing that is most commonly referenced in the SAT).

As you see on the slide, scores on the SAT are represented across a 200–800 point range. For the PSAT/NMSQT and the PSAT 10, scores range from 160–760. And the PSAT 8/9 scores will range from 120–720. Scores across the tests can be thought of as equivalent. In other words, a 600 on the PSAT 8/9 is equivalent to a 600 on the SAT.

NOTE: Subscores are not vertically scaled, therefore you would not be able to show growth for a student or aggregate from assessment to assessment at the subscore level.
Suggested Discussion Points/Handouts/Activities

SLIDE 6

Move into an overview of the Math Test.
Suggested Discussion Points/Handouts/Activities

SLIDE 7 | ESTIMATED TIME (IN MINUTES): 1

The **Math Test** requires students to exhibit mathematical practices, such as problem solving and using appropriate tools strategically, on questions focused on the Heart of Algebra, Problem Solving and Data Analysis, and advanced mathematics. Questions in each content area span the full range of difficulty and address relevant practices, fluency, and conceptual understanding. Students are asked to:

- analyze, fluently solve, and create linear equations and inequalities;
- demonstrate reasoning about ratios, rates, and proportional relationships;
- interpret and synthesize data and apply core concepts and methods of statistics in science, social studies, and career-related contexts;
- identify quantitative measures of center, the overall pattern, and any striking deviations from the overall pattern and spread in one or two different data sets, including recognizing the effects of outliers on the measures of center of a data set;
- rewrite expressions, identify equivalent forms of expressions, and understand the purpose of different forms;
- solve quadratic and higher-order equations in one variable and understanding the graphs of quadratic and higher-order functions;
- interpret and build functions.
- apply essential geometric and trigonometric concepts.
The overall aim of the Math Test is to assess fluency with, understanding of, and ability to apply the mathematical concepts that are most strongly prerequisite for and useful across a wide range of college majors and careers.

The test has a calculator portion and a no-calculator portion. In the calculator portion, students can use their calculators to perform routine computations more efficiently, enabling them to focus on mathematical applications and reasoning. However, the calculator is a tool that students must use strategically, deciding when and how to use it. There are some questions in the calculator portion that can be answered more efficiently without a calculator. In these cases, students who make use of structure or their ability to reason will most likely reach the solution more rapidly than students who use a calculator.

The SAT Math Test has 13 questions which are NOT multiple choice: eight (8) on the calculator portion and five (5) on the no-calculator portion. Students have to grid in their answers rather than select one answer.

On student-produced response questions, students grid in their answers, which often allows for multiple correct responses and solution processes. Such items allow students to freely apply their critical thinking skills when planning and implementing a solution.

The PSAT/NMSQT, PSAT 10, and PSAT 8/9 also have calculator and no-calculator portions, and include multiple-choice and student-produced response questions. They have fewer questions than the SAT. Slide 11 displays the numbers of questions for the PSAT/NMSQT–PSAT 10 and the PSAT 8/9.
The Math Test contains two portions: one in which the student may use a calculator and another in which the student may not. The no-calculator portion allows the SAT Suite to assess fluencies valued by postsecondary instructors and includes conceptual questions for which a calculator will not be helpful.

Meanwhile, the calculator portion gives insight into students’ capacity to use appropriate tools strategically. The calculator is a tool that students must use (or not use) judiciously. The calculator portion of the test includes more complex modeling and reasoning questions to allow students to make computations more efficiently. However, this portion also includes questions in which the calculator could be a deterrent to expedience, thus assessing appropriate use of tools. For these types of questions, students who make use of structure or their ability to reason will reach the solution more rapidly than students who get bogged down using a calculator.
Suggested Discussion Points/Handouts/Activities

SLIDE 10 ESTIMATED TIME (IN MINUTES): 1

Student-produced response item set questions on the SAT Suite of Assessments measure the complex knowledge and skills that require students to deeply think through the solutions to problems. Set within a range of real-world contexts, these questions require students to make sense of problems and persevere in solving them; make connections between and among the different parts of a stimulus; plan a solution approach, as no scaffolding is provided to suggest a solution strategy; abstract, analyze, and refine an approach as needed; and produce and validate a response. These types of questions require the application of complex cognitive skills.

Responses are gridded in by students, often allowing for multiple correct responses and solution processes. These items allow students to freely apply their critical thinking skills when planning and implementing a solution.

Student-produced response questions, or grid-ins:

- The answer to each student-produced response question is a number (fraction, decimal, or positive integer) that will be entered on the answer sheet into a grid such as the one shown here.
- Students may also enter a fraction line or a decimal point.
Suggested Discussion Points/Handouts/Activities

SLIDE 11 | ESTIMATED TIME (IN MINUTES): 1

There are a total of 58 questions on the SAT Math Test. Other assessments in the SAT Suite have fewer questions.

**Subscores:** On the SAT, the Heart of Algebra subscore is derived from 19 questions on the Math Test; Problem Solving and Data Analysis subscore is derived from 17 questions; Passport to Advanced Math subscore is derived from 16 questions on the Math Test. The number of questions contributing to each subscore is slightly lower on the PSAT/NMSQT and PSAT 10, as well as on the PSAT 8/9. Numbers are listed on the slide.

Eight math questions (14% of total questions) contribute to the Analysis in Science subscore and eight questions (14% of total questions) contribute to the Analysis in History/Social Studies subscore. Seven questions contribute to each cross-test score on the PSAT/NMSQT and PSAT 10; six questions contribute to each cross-test score on the PSAT 8/9.

**NOTE:** Each multiple-choice question will have four answer choices on the SAT. Previously there were five choices.

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### Math Test Specifications

<table>
<thead>
<tr>
<th>Question Types</th>
<th>SAT</th>
<th>PSAT/NMSQT</th>
<th>PSAT 10</th>
<th>PSAT 8/9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Questions</strong></td>
<td>58</td>
<td>48</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td><strong>Multiple-Choice</strong></td>
<td>45</td>
<td>40</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td><strong>Student-Produced Response</strong></td>
<td>13</td>
<td>8</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>Heart of Algebra</strong></td>
<td>19</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td><strong>Problem Solving and Data Analysis</strong></td>
<td>17</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td><strong>Passport to Advanced Math</strong></td>
<td>16</td>
<td>14</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Topics in Math</strong></td>
<td>6</td>
<td>2</td>
<td>0</td>
<td></td>
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</table>

### Contribution of Questions to Subscores

<table>
<thead>
<tr>
<th>Analysis in Science</th>
<th>8</th>
<th>7</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis in History/Social Studies</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

*Questions under Additional Topics in Math contribute to the total Math Test score but do not contribute to a subscore within the Math Test.*
Suggested Discussion Points/Handouts/Activities

| SLIDE 12 | ESTIMATED TIME (IN MINUTES): 15 MINUTE ACTIVITY |

**Handout:** Math Test Domains

**Activity:** Organize participants into small groups. Using the SAT Math Domains, assign each group one Domain. Give the groups 5–7 minutes to review the domain content dimensions and descriptions, then ask one member of each group to share the most important information gleaned from their section. Ask participants to predict areas in which students will struggle most. Write this information on chart paper if available.

**Outcome:** Participants will have a deeper understanding of the content and skills assessed on the Math Test.
If someone is viewing this module and is not a math teacher, it is important to understand that questions on the Math Test that contribute to the Passport to Advanced Math subscore and the Additional Topics in Math subscore also contribute to the Analysis in Science and Analysis in History/Social Studies cross-test scores. Eight questions from the Math Test contribute to each cross-test score on the SAT (seven on the PSAT/NMSQT–PSAT 10, and six on the PSAT 8/9). Those questions have data, tables, charts, and context in the sciences and social studies.

Note that test questions don’t ask students to provide history/social studies or science facts, such as the year the Battle of Hastings was fought or the chemical formula for a particular molecule. Instead, these questions ask students to apply the skills that they have picked up in history, social studies, and science courses to problems in reading, writing, language, and math. On the Math Test, some questions ask them to solve problems grounded in social studies or science contexts. Scores in Analysis in Science and in Analysis in History/Social Studies are drawn from questions on all three of those tests.
## Suggested Discussion Points/Handouts/Activities

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When students take any assessment in the SAT Suite, they encounter an assessment that is closely connected to their classroom experience, one that rewards focused work and the development of valuable, durable knowledge, skills, and understandings. The questions and approaches they encounter are more familiar to them because they are modeled on the work of the best classroom teachers.

Students are the priority and the most important thing is to focus on the work that takes place in the classroom. The SAT Suite of Assessments, therefore, is more integrated with classroom instruction than ever before. With its deeper focus on fewer topics and current instructional best practices, it aligns to instruction, rather than presenting more responsibilities. No one will be “teaching to the test”— instead, the test reflects good teaching.

*Ask the participants: What are some of the research-based best practices in math instruction that you use?*
Suggested Discussion Points/Handouts/Activities

SLIDE 15 | ESTIMATED TIME (IN MINUTES): 1

These General Instructional Strategies come from the Redesigned SAT Teacher Implementation Guide. These strategies do not apply to any specific mathematical process, but are general ideas to consider when designing specific skill-building strategies.

- Ensure that students practice solving multistep problems. The SAT Suite often asks them to solve more than one problem to arrive at the correct answer.

- Separate students into small working groups. Ask them to discuss how to arrive at solutions. When their solutions are incorrect, ask them to discuss how to make corrections. Encourage students to express quantitative relationships in meaningful words and sentences to support their arguments and conjectures.

- Vary the types of problems in homework assignments so that students aren’t always using the same strategy to find solutions. Students benefit from the practice of determining the right mathematical strategy to solve the problems, in addition to solving the problems correctly.

- Assign students math problems or create classroom-based assessments that do not allow the use of a calculator. This practice encourages greater number sense, probes students’ understanding of content on a conceptual level, and aligns to the format of the SAT Suite.

- Instead of choosing a correct answer from a list of options, ask students to solve problems and enter their answers in grids provided on an answer sheet on your classroom and common assessments.
Suggested Discussion Points/Handouts/Activities

Handout: Skill-Building Strategies Brainstorm Activity

Activity: Foreshadow the upcoming activity (to be completed after discussing the assessed skills and sample questions for each domain).

On upcoming slides, participants will review sample questions in Passport to Advanced Math and Additional Topics in Math. Using the Skill-Building Strategies Brainstorm Activity, they will consider which instructional strategies they are currently using will help reinforce skills related to these domains. They will also brainstorm additional strategies they could use to teach the skills.
Begin discussion of Passport to Advanced Math.
As an assessment that provides an entry point to postsecondary education and careers, the Math Test includes topics that are central to the ability of students to progress to later, more advanced mathematics. Problems in Passport to Advanced Math cover topics that have great relevance and utility for college and career work.

Chief among these topics is the understanding of the structure of expressions and the ability to analyze, manipulate, and rewrite these expressions. This includes an understanding of the key parts of expressions, such as terms, factors, and coefficients, and the ability to interpret complicated expressions made up of these components. Students will be able to show their skill in rewriting expressions, identifying equivalent forms of expressions, and understanding the purpose of different forms.

This category also includes reasoning with more complex equations, including solving quadratic and higher-order equations in one variable and understanding the graphs of quadratic and higher-order functions. Finally, this category includes the ability to interpret and build functions, another skill crucial for success in later mathematics and scientific fields.
Suggested Discussion Points/Handouts/Activities

SLIDE 19  ESTIMATED TIME (IN MINUTES): 1

The Math Test rewards a strong command of few important topics. Students will need to exhibit command of mathematical practices, fluency with mathematical procedures, and conceptual understanding of mathematical ideas. The assessments also provide opportunities for richer applied problems as skills on the slide are assessed.

*Students Will:*
Create and solve quadratic and exponential problems.
Create and solve radical and rational equations.
Solve systems of equations.
Understand the relationship between zeros and factors of polynomials.
Ask a participant to read the problem and give people a couple of minutes to solve it. Ask another participant to talk through the reasoning. Remind participants they’ll be brainstorming strategies to teach this skill.

Students could tackle this problem in many different ways, but the focus is on their understanding of the zeros of a polynomial function and how they are used to construct algebraic representations of polynomials. Note: this is a great example of the multistep problems students encounter on the SAT Math Test.

See next slide for full answer explanation.
Suggested Discussion Points/Handouts/Activities

**SLIDE 21**

**ESTIMATED TIME (IN MINUTES): 3**

**Answer Explanation**: Choice A is correct. The given zeros can be used to set up an equation to solve for \( c \). Substituting –4 for \( x \) and 0 for \( y \) yields –4\( c \) = 72, or \( c = –18 \).

Alternatively, since –4, 1/2, and \( p \) are zeros of the polynomial function
\[
f(x) = 2x^3 + 3x^2 + cx + 8,
\]

it follows that
\[
f(x) = (2x − 1)(x + 4)(x − p).
\]

Were this polynomial multiplied out, the constant term would be
\[
(−1)(4)(−p) = 4p.
\]

(We can see this without performing the full expansion.)

Since it is given that this value is 8, it goes that \( 4p = 8 \) or rather, \( p = 2 \). Substituting 2 for \( p \) in the polynomial function yields
\[
f(x) = (2x − 1)(x + 4)(x − 2),
\]

and after multiplying the factors one finds that the coefficient of the \( x \) term, or the value of \( c \), is –18.

Choice B is not the correct answer. This value is a misunderstood version of the value of \( p \), not \( c \), and the relationship between the zero and the factor (if \( a \) is the zero of a polynomial, its corresponding factor is \( x − a \)) has been confused.

Choice C is not the correct answer. This is the value of \( p \), not \( c \). Using this value as the third factor of the polynomial will reveal that the value of \( c \) is –18.

Choice D is not the correct answer. This represents a sign error in the final step in determining the value of \( c \).
Suggested Discussion Points/Handouts/Activities

SLIDE 22

ESTIMATED TIME (IN MINUTES):

Begin discussion of Additional Topics in Math.
Suggested Discussion Points/Handouts/Activities

SLIDE 23 | ESTIMATED TIME (IN MINUTES): 1

The SAT Suite requires the geometric and trigonometric knowledge most relevant to postsecondary education and careers. By connecting algebra and geometry, analytical geometry becomes a powerful method of analysis and problem solving. The trigonometric functions of sine, cosine, and tangent for acute angles are derived from right triangles and similarity. When combined with the Pythagorean Theorem, the trigonometric functions can be used to solve many real-world problems.

What is ‘Additional Topics in Math?’

The SAT will require the geometric and trigonometric knowledge most relevant to postsecondary education and careers.

- Geometry
  - Analysis
  - Problem solving
- Trigonometry
  - Sine
  - Cosine
  - Tangent
- Pythagorean Theorem
Suggested Discussion Points/Handouts/Activities

SLIDE 24

ESTIMATED TIME (IN MINUTES): 1

This is a summary of the assessed skills in the Additional Topics in Math domain.

Students will:

› Solve problems using volume formulas.
› Solve problems involving right triangles.
› Apply theorems about circles.
› Solve problems about lines, angles, and triangles.
Suggested Discussion Points/Handouts/Activities

SLIDE 25 | ESTIMATED TIME (IN MINUTES): 3

Activity: Ask a participant to read the problem and give people a couple of minutes to solve it. Ask another participant to talk through the answer explanation on the next slide.

NOTE: This question is a “student-produced response question,” which asks the students to write in the correct answer rather than selecting one of the given answers. About 20% of the Math Test will be student-produced response questions.
**Suggested Discussion Points/Handouts/Activities**

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<th>ESTIMATED TIME (IN MINUTES): 3</th>
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**Ask a participant to review the answer explanation.**

This problem requires students to make use of properties of triangles in an abstract setting.

Because the triangle is isosceles, dropping an altitude from the top to the base will bisect the base and create two smaller right triangles. In a right triangle, the cosine of an acute angle is equal to the length of the adjacent side divided by the hypotenuse. This gives \( \cos x = \frac{16}{24} \), which can be simplified to \( \cos x = \frac{2}{3} \). This can be gridded as \( \frac{2}{3} \) or .667.

**Handout:** Sample SAT Math Questions. Give participants 5 minutes to review the additional questions in the handout.

**Additional Topics in Math: Answer Explanation**

What is the value of \( \cos x \)?

This problem requires students to make use of properties of triangles to solve a problem.

Because the triangle is isosceles, constructing a perpendicular from the top vertex to the opposite side will bisect the base and create two smaller right triangles. In a right triangle, the cosine of an acute angle is equal to the length of the side adjacent to the angle divided by the length of the hypotenuse. This gives \( \cos x = \frac{16}{24} \), which can be simplified to \( \cos x = \frac{2}{3} \).
**Suggested Discussion Points/Handouts/Activities**

**SLIDE 27 | ESTIMATED TIME (IN MINUTES): 10**

**Handout:** Skill-Building Strategies Brainstorm Activity

**Activity:** Reference the Skill-Building Strategies Brainstorm Activity. Ask pairs of participants to discuss and write the strategies they currently use that support the development of skills related to Passport to Advanced Math and Additional Topics in Math, using the sample questions to guide their discussion.

Ask pairs to share either one idea or one strategy they currently use. On the Skill-Building Strategies Brainstorm Activity, participants can fill in the lower box with new ideas being shared.

**Outcome:** Participants will connect the questions and assessed skills with strategies they can use for instruction in the classroom.
Suggested Discussion Points/Handouts/Activities

**Handout:** Instructional Strategies for SAT Math

This slide lists additional skill-building strategies found in the *Redesigned SAT Teacher Implementation Guide*. Share with participants to add to their Skill-Building Strategies Brainstorm Activity.

1. Provide students with explanations and/or equations that incorrectly describe a graph. Ask students to identify the errors and provide corrections, citing the reasoning behind the change.

2. Students can organize information to present data and answer a question or show a problem solution using multiple methods. Ask students to create pictures, tables, graphs, lists, models, and/or verbal expressions to interpret text and/or data to help them arrive at a solution.

3. As students work in small groups to solve problems, facilitate discussions in which they communicate their own thinking and critique the reasoning of others as they work toward a solution. Ask open-ended questions. Direct their attention to real-world situations to provide context for the problem.

4. Use “Guess and Check” to explore different ways to solve a problem when other strategies for solving are not obvious. Students first guess the solution to a problem, then check that the guess fits the information in the problem and is an accurate solution. They can then work backward to identify proper steps to arrive at the solution.

**Skill-Building Strategies for Math**

- Provide students with explanations and/or equations that incorrectly describe a graph and ask them to correct the errors.
- Ask students to create pictures, tables, graphs, lists, models, and/or verbal expressions to interpret text and/or data to help them arrive at a solution.
- Organize students in small groups and have them work together to solve problems.
- Use “Guess and Check” to explore different ways to solve a problem when other strategies for solving are not obvious.
**Suggested Discussion Points/Handouts/Activities**

<table>
<thead>
<tr>
<th>SLIDE 29</th>
<th>ESTIMATED TIME (IN MINUTES):</th>
</tr>
</thead>
</table>

Introduce Scores and Reporting.

---

**CHAPTER 4 | Scores and Reporting**

For more information about SAT Suite scores and reports:
- Professional Development Module 6 – Using Scores and Reporting to Inform Instruction
- SAT Suite of Assessments: Using Scores and Reporting to Inform Instruction
On the next 2 slides, three reports from the SAT Suite of Assessments are highlighted. There are several additional reports that are available in the K–12 Assessment Reporting Tool.

Reports from the SAT Suite of Assessments provide several data points that help teachers pinpoint what students need, both individually and in groups, for additional support to become college and career ready. The K–12 Assessment Reporting Tool supports effective decision making with a variety of standard reports that can be configured in multiple ways. The tool generates score reports, benchmark reports, and demographic reports. It also provides Instructional Planning and Question Analysis reports that allow teachers to drill down to the student level and analyze the questions students encountered on the actual assessment, as well as content and skill gaps.

Share information listed about the Student Score Report, Question Analysis Report, and Instructional Planning Report to help participants understand how the reports provide information about a student’s learning in Passport to Advanced Math and Additional Topics in Math.

Sample SAT Suite of Assessments Reports

- **Score Report** (Statistics for state/district/school)
  - Mean scores and score band distribution
  - Participation rates when available
  - High-level benchmark information, with tie to detailed benchmark reports

- **Question Analysis Report**
  - Aggregate performance on each question (easy vs. medium vs. hard difficulty) in each test
  - Percent of students who selected each answer for each question
  - Applicable subscores and cross-test score mapped to each question
  - Comparison to parent organization(s) performance
  - Access question details for disclosed form (question stem, stimulus, answer choices and explanations)
Suggested Discussion Points/Handouts/Activities

SLIDE 31 | ESTIMATED TIME (IN MINUTES): 2

Ask participants to share one way they might use one of the reports.
Suggested Discussion Points/Handouts/Activities

**SLIDE 32**  
**ESTIMATED TIME (IN MINUTES): 2**

**Handout:** Follow-Up Activity: Tips for Professional Learning Communities and Vertical Teams

**Follow-Up Activity:** Explain that this is one protocol teams can use to review and analyze SAT Suite reports (or any other data). The guide asks participants to make observations about the data, look for areas of focus, identify skills associated with the areas of focus, review other sources of data for additional information, and devise a plan of action.
Suggested Discussion Points/Handouts/Activities

| SLIDE 33 | ESTIMATED TIME (IN MINUTES): 5 |

**Handout:** Questions for Reflection

**Activity:** Ask participants to reflect on their teaching and what they’ve learned in the presentation.

Give participants 5 minutes to consider the questions in the self-assessment and write their reflections.

---

**Self Assessment/Reflection**

- How well do I teach students skills related to Passport to Advanced Math?
- How well do I teach students skills related to Additional Topics in Math?
- What can I do in my classroom immediately to help students understand what they’ll see on the SAT?
- How can I adjust my assessments to reflect the structure of questions on the SAT?
- What additional resources do I need to gather in order to support students in becoming college and career ready?
- How can I help students keep track of their own progress toward meeting the college and career ready benchmark?
Suggested Discussion Points/Handouts/Activities

SLIDE 34 | ESTIMATED TIME (IN MINUTES): 1

The *Redesigned SAT Teacher Implementation Guide* can be accessed at collegereadiness.collegeboard.org

The *Redesigned SAT Teacher Implementation Guide* was created for teachers and curriculum specialists to generate ideas about integrating SAT practice and skill development into challenging classroom course work through curriculum and instruction. The College Board has been reaching out to K–12 teachers, curriculum specialists, counselors, and administrators throughout the process. Educator feedback is the basis and inspiration for this guide, which covers the whys and hows of the SAT and its benefits for you and your students.
Suggested Discussion Points/Handouts/Activities

SLIDE 35 | ESTIMATED TIME (IN MINUTES): 1

At the heart of this guide are annotated sample SAT Questions, highlighting connections to the instruction and best practices occurring in classrooms like yours. We indicate Keys to the SAT (information about test changes), General Instructional Strategies for each test, and Skill-Building Strategies linked to specific sample questions from the Reading, Writing and Language, and Math Tests and the optional SAT Essay. In sum, these recommendations are intended to support teachers to enhance instruction that will build skills necessary for college and career success for each student.
Suggested Discussion Points/Handouts/Activities

SLIDE 36 | ESTIMATED TIME (IN MINUTES): 1

Inform participants that they can have their questions answered by emailing SATinstructionalsupport@collegeboard.org.
## Suggested Discussion Points/Handouts/Activities

<table>
<thead>
<tr>
<th>SLIDE 37</th>
<th>ESTIMATED TIME (IN MINUTES): 3</th>
</tr>
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</table>

https://www.surveymonkey.com/s/PD_Module_5
### SAT PASSPORT TO ADVANCED MATH DOMAIN

<table>
<thead>
<tr>
<th>Content Dimension</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Equivalent expressions**                            | 1. Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including  
   a. rewriting simple rational expressions;  
   b. rewriting expressions with rational exponents and radicals;  
   c. factoring polynomials.  
  2. Fluently add, subtract, and multiply polynomials.                                                  |
| **Nonlinear equations in one variable and systems of equations in two variables**                      | 1. Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to  
   a. solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, 1 real solution, or 2 real solutions;  
   b. solve simple rational and radical equations in one variable;  
   c. identify when the procedures used to solve a simple rational or radical equation in one variable lead to an equation with solutions that do not satisfy the original equation (extraneous solutions);  
   d. solve polynomial equations in one variable that are written in factored form;  
   e. solve linear absolute value equations in one variable;  
   f. solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system.  
  2. Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.  
  3. Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.  
  4. Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation. |
| **Nonlinear functions**                                | 1. Create and use quadratic or exponential functions to solve problems in a variety of contexts.  
  2. For a quadratic or exponential function,  
   a. identify or create an appropriate function to model a relationship between quantities;  
   b. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph;  
   c. for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage;  
   d. determine the most suitable form of the expression representing the output of the function to display key features of the context, including  
      i. selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value;  
      ii. selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time;  
   e. make connections between tabular, algebraic, and graphical representations of the function, by  
      i. given one representation, selecting another representation;  
      ii. identifying features of one representation given another representation, including maximum and minimum values of the function;  
      iii. determining how a graph is affected by a change to its equation, including a vertical shift or scaling of the graph. |
### SAT PASSPORT TO ADVANCED MATH DOMAIN

<table>
<thead>
<tr>
<th>Content Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. For a factorable or factored polynomial or simple rational function,</td>
<td></td>
</tr>
<tr>
<td>a. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph;</td>
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<tr>
<td>b. understand and use the fact that for the graph of ( y = f(x) ), the solutions to ( f(x) = 0 ) correspond to ( x )-intercepts of the graph and ( f(0) ) corresponds to the ( y )-intercept of the graph; interpret these key features in terms of a context;</td>
<td></td>
</tr>
<tr>
<td>c. identify the graph given an algebraic representation of the function and an algebraic representation given the graph (with or without a context).</td>
<td></td>
</tr>
<tr>
<td>Content Dimension</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Area and volume</strong></td>
<td>1. Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume.</td>
</tr>
<tr>
<td></td>
<td>a. Apply knowledge that changing by a scale factor of ( k ) changes all lengths by a factor of ( k ), changes all areas by a factor of ( k^2 ), and changes all volumes by a factor of ( k^3 ).</td>
</tr>
<tr>
<td></td>
<td>b. Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.</td>
</tr>
<tr>
<td><strong>Lines, angles, and triangles</strong></td>
<td>1. Use concepts and theorems relating to congruence and similarity of triangles to solve problems.</td>
</tr>
<tr>
<td></td>
<td>2. Determine which statements may be required to prove certain relationships or to satisfy a given theorem.</td>
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<tr>
<td></td>
<td>3. Apply knowledge that changing by a scale factor of ( k ) changes all lengths by a factor of ( k ), but angle measures remain unchanged.</td>
</tr>
<tr>
<td></td>
<td>4. Know and directly apply relevant theorems such as a. the vertical angle theorem; b. triangle similarity and congruence criteria; c. triangle angle sum theorem; d. the relationship of angles formed when a transversal cuts parallel lines.</td>
</tr>
<tr>
<td><strong>Right triangles and trigonometry</strong></td>
<td>1. Solve problems in a variety of contexts using a. the Pythagorean theorem; b. right triangle trigonometry; c. properties of special right triangles.</td>
</tr>
<tr>
<td></td>
<td>2. Use similarity to calculate values of sine, cosine, and tangent.</td>
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<tr>
<td></td>
<td>3. Understand that when given one side length and one acute angle measure in a right triangle, the remaining values can be determined.</td>
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<tr>
<td></td>
<td>4. Solve problems using the relationship between sine and cosine of complementary angles.</td>
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<tr>
<td></td>
<td>5. Fluently apply properties of special right triangles to determine side-lengths and calculate trigonometric ratios of 30, 45, and 60 degrees.</td>
</tr>
<tr>
<td><strong>Circles</strong></td>
<td>1. Use definitions, properties, and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc lengths, and sector areas to solve problems.</td>
</tr>
<tr>
<td></td>
<td>2. Solve problems using a. radian measure; b. trigonometric ratios in the unit circle.</td>
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<tr>
<td></td>
<td>3. Create an equation to represent a circle in the ( xy )-plane.</td>
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<tr>
<td></td>
<td>4. Describe how a. a change to the equation representing a circle in the ( xy )-plane affects the graph of the circle; b. a change in the graph of the circle affects the equation of the circle.</td>
</tr>
<tr>
<td></td>
<td>5. Understand that the ordered pairs that satisfy an equation of the form ( (x - h)^2 + (y - k)^2 = r^2 ) form a circle when plotted in the ( xy )-plane.</td>
</tr>
<tr>
<td></td>
<td>6. Convert between angle measures in degrees and radians.</td>
</tr>
<tr>
<td></td>
<td>7. Complete the square in an equation representing a circle to determine properties of the circle when it is graphed in the ( xy )-plane, and use the distance formula in problems related to circles.</td>
</tr>
<tr>
<td><strong>Complex numbers</strong></td>
<td>1. Apply knowledge and understanding of the complex number system to add, subtract, multiply and divide with complex numbers and solve problems.</td>
</tr>
</tbody>
</table>
INSTRUCTIONAL STRATEGIES

» Provide students with explanations and/or equations that incorrectly describe a graph. Ask students to identify the errors and provide corrections, citing the reasoning behind the change.

» Students can organize information to present data and answer a question or show a problem solution in multiple ways. Ask students to create pictures, tables, graphs, lists, models, and/or verbal expressions to interpret text and/or data to help them arrive at a solution.

» Ask students to solve problems that require multiple steps to arrive at the solution.

» As students work in small groups to solve problems, facilitate discussions in which they communicate their own thinking and critique the reasoning of others as they work toward a solution. Ask open-ended questions. Direct their attention to real-world situations to provide context for the problem.

» Help students strengthen skills in problem solving and data analysis by reading and understanding graphs in many contexts. Ask them to find a chart/graph/table from a periodical and write a series of questions about the graphic to be discussed in class. Challenge them to dig deep into the data and the purpose of the graphic, then ask meaningful questions about it. Ask them to present purposefully incorrect interpretations and ask the class to correct their analyses.

» The Math Test emphasizes students’ ability to apply math to solve problems in rich and varied contexts, and features items that require problem solving and data analysis to solve problems in science, social studies, and career-related contexts. Students must see how the math problems they solve are generated from questions in science, social studies, economics, psychology, health, and other career content areas. Give them many opportunities to practice in all of their classes.

» Use “Guess and Check” to explore different ways to solve a problem when other strategies for solving are not obvious. Students first guess the solution to a problem, then check that the guess fits the information in the problem and is an accurate solution. They can then work backward to identify proper steps to arrive at the solution.

» Assign math problems for students to solve without the use of a calculator. Assign problems for which the calculator is actually a deterrent to expediency and give students the choice whether to utilize the calculator. Discuss how to solve both ways, and which method is more advantageous.
Passport to Advanced Math

Calculator

1. The function $f(x)$ is defined by $f(x) = 2x^3 + 3x^2 + cx + 8$, where $c$ is a constant. In the xy-plane, the graph of $f$ intersects the x-axis at the three points $(-4, 0)$, $(\frac{1}{2}, 0)$, and $(p, 0)$. What is the value of $c$?

A) $-18$
B) $-2$
C) $2$
D) $10$

Students could tackle this problem in many different ways, but the focus is on their understanding of the zeros of a polynomial function and how they are used to construct algebraic representations of polynomials.

Choice A is correct. The given zeros can be used to set up an equation to solve for $c$. Substituting $-4$ for $x$ and $0$ for $y$ yields $-4c = 72$, or $c = -18$.

Alternatively, since $-4$, $\frac{1}{2}$, and $p$ are zeros of the polynomial function $f(x) = 2x^3 + 3x^2 + cx + 8$, it follows that $f(x) = (2x - 1)(x + 4)(x - p)$.

Were this polynomial multiplied out, the constant term would be $(-1)(4)(-p) = 4p$. (We can see this without performing the full expansion.) Since it is given that this value is $8$, it goes that $4p = 8$ or rather, $p = 2$. Substituting $2$ for $p$ in the polynomial function yields $f(x) = (2x - 1)(x + 4)(x - 2)$, and after multiplying the factors one finds that the coefficient of the $x$ term, or the value of $c$, is $-18$.

Choice B is not the correct answer. This value is a misunderstood version of the value of $p$, not $c$, and the relationship between the zero and the factor (if $a$ is the zero of a polynomial, its corresponding factor is $x - a$) has been confused.

Choice C is not the correct answer. This is the value of $p$, not $c$. Using this value as the third factor of the polynomial will reveal that the value of $c$ is $-18$.

Choice D is not the correct answer. This represents a sign error in the final step in determining the value of $c$. 
Additional Topics in Math
Calculator
Student-Produced Response Problem

2.

![Diagram of a triangle with sides labeled x and 32 ft, and an angle marked x.]

Note: Figure not drawn to scale.

What is the value of $\cos x$?

This problem requires students to make use of properties of triangles to solve a problem.

Because the triangle is isosceles, constructing a perpendicular from the top vertex to the opposite side will bisect the base and create two smaller right triangles. In a right triangle, the cosine of an acute angle is equal to the length of the side adjacent to the angle divided by the length of the hypotenuse. This gives $\cos x = \frac{16}{24}$, which can be simplified to $\cos x = \frac{2}{3}$.

Passport to Advanced Math
No calculator

3. What is one possible solution to the equation $\frac{24}{x + 1} - \frac{12}{x - 1} = 1$?

Students should look for the best solution methods for solving rational equations before they begin. Looking for structure and common denominators will prove very useful at the onset and will help prevent complex computations that do not lead to a solution.

In this problem, multiplying both sides of the equation by the common denominator $(x + 1)(x - 1)$ yields $24(x - 1) - 12(x + 1) = (x + 1)(x - 1)$. Multiplication and simplification then yields

$12x - 36 = x^2 - 1$, or

$x^2 - 12x + 35 = 0$.

Factoring the quadratic gives $(x - 5)(x - 7) = 0$, so the solutions occur at $x = 5$ and $x = 7$, both of which should be checked in the original equation to ensure that they are not extraneous. In this case, both values are solutions.
Additional Topics in Math

No Calculator

4. Which of the following is equal to $\sin \left( \frac{\pi}{5} \right)$?

A) $-\cos \left( \frac{\pi}{5} \right)$

B) $-\sin \left( \frac{\pi}{5} \right)$

C) $\cos \left( \frac{3\pi}{10} \right)$

D) $\sin \left( \frac{7\pi}{10} \right)$

This question is solved most efficiently when a student is fluent with radian measure and has a conceptual understanding of the relationship between the sine and cosine functions.

Choice C is correct. Sine and cosine are related by the equation:

$$\sin(x) = \cos \left( \frac{\pi}{2} - x \right).$$

Therefore, $\sin \left( \frac{\pi}{5} \right) = \cos \left( \frac{\pi}{2} - \frac{\pi}{5} \right)$, which reduces to $\cos \left( \frac{\pi}{10} \right)$.

Choice A is not the correct answer. This answer may result from a misunderstanding about trigonometric relationships. A student may think that cosine is the opposite function of sine, and therefore think that the negative of the cosine of an angle is equivalent to the sine of that angle.

Choice B is not the correct answer. This answer may result from a misunderstanding of the unit circle and how it relates to trigonometric expressions. A student may think that, on a coordinate grid, the negative sign only changes the orientation of the triangle formed, not the value of the trigonometric expression.

Choice D is not the correct answer. The student mistakenly remembers the relationship between sine and cosine and adds $\frac{\pi}{2}$ to the angle measure instead of subtracting the angle measure from $\frac{\pi}{2}$. 
### PASSPORT TO ADVANCED MATH AND ADDITIONAL TOPICS IN MATH

<table>
<thead>
<tr>
<th>What strategies am I currently using in the classroom to teach Passport to Advanced Math and Additional Topics in Math? What are students doing in my classroom to develop these skills?</th>
<th>What strategies have I considered but not tried in my classroom? What ideas come to mind as I read the assessed skills and sample items?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What strategies are being shared that I might use in lesson planning for my students?</td>
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</tbody>
</table>
Protocols for analyzing data can provide guidance and focus for Professional Learning Communities as they review and discuss data and reports.

1. Review your data. These data may include SAT results on the Score Report, Question Analysis Report, Instructional Planning Report, or other reports from the online portal. These reports can be reviewed independently, together, or in combination with local assessment data. Ask each person in the group to make an observation about the data. Consider the following questions for guidance:
   a. What scores are higher/lower than average?
   b. What scores are higher/lower than in previous years?
   c. What scores are higher/lower than expected?
   d. Which questions were answered correctly more often than average? Less often?

2. Examine all of the observations of the group. Select one or two observations to analyze and discuss further. Determine whether the group discussion should be focused on gaps, strengths, or both. To select an area of focus, the group can consider:
   a. Are the scores on one subscore exceptionally high or low?
   b. Are there high/low scores on several questions related to the same content or skill?
   c. Do several questions with high/low scores ask students to engage in the same tasks (e.g., are the questions all no-calculator questions or are they all student-produced response questions)?

3. Identify content and skills associated with the area of focus; how are the content and skills included in your curriculum/lesson plans?
   a. Is the skill listed as an objective in lesson plans? Is it practiced frequently?
   b. Is the skill explicitly assessed? Is it assessed differently on different tests?
   c. Does the curriculum provide sufficient attention to the skill?

4. Review other sources of data (i.e., class and state assessments) to look for evidence of students’ performance on this skill/topic.

5. Develop an action plan for addressing the area of focus:
   a. Set a goal for improvement, including a time frame for measuring progress.
   b. Determine how you’ll measure success.
   c. Design specific steps for addressing the issue:
      i. Add a unit to the curriculum?
      ii. Include specific lessons in current units?
      iii. Observe lessons in other classrooms to expand repertoire of instructional strategies and incorporate a variety of strategies more frequently?
      iv. Add formative assessment, collaborative learning, or other student engagement activities?
   d. Assess students and measure progress at regular intervals.
   e. Discuss results and celebrate successes.
## Professional Learning Community Data Analysis

<table>
<thead>
<tr>
<th>Review the data and make observations.</th>
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<table>
<thead>
<tr>
<th>Examine all of the observations of the group. Select one or two areas of focus from the observations to analyze and discuss further. Determine whether the group discussion should be focused on gaps, strengths, or both.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Identify content/skills associated with the area(s) of focus.</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Develop the action plan.</th>
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</table>

| Develop the action plan. | Goal:  
Measure of Success:  
Steps:  
When you’ll measure: |
|---------------------------|------------------|------------------|------------------|------------------|
### QUESTIONS FOR REFLECTION

<table>
<thead>
<tr>
<th>Question</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>How well do you teach students skills related to Passport to Advanced Math?</td>
<td></td>
</tr>
<tr>
<td>How well do you teach students skills related to Additional Topics in Math?</td>
<td></td>
</tr>
<tr>
<td>What immediate adjustments can you make to support students in developing their mastery of Passport to Advanced Math and Additional Topics in Math?</td>
<td></td>
</tr>
<tr>
<td>What long-term adjustments can you make to support students in developing their mastery of Passport to Advanced Math and Additional Topics in Math?</td>
<td></td>
</tr>
<tr>
<td>What additional resources do you need to gather in order to support students in becoming college and career ready?</td>
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<tr>
<td>How can you help students keep track of their own progress toward meeting the college and career readiness benchmarks?</td>
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</tbody>
</table>
FOLLOW-UP ACTIVITIES: SAT MATH TEST SPECIFICATIONS

Curriculum Mapping
1. Gather curriculum maps for math courses.
2. Referencing the *SAT Math Test Domains* handout (pp. 42–44), identify where each content dimension is taught.
3. Consider and discuss other places in the curriculum where skills and content can be reinforced.
4. Review common assessments and ensure skills and content are assessed and student progress is measured.

Assessment Study Groups
1. Form Assessment Study Groups to review SAT Test Questions with the SAT Test Specifications.
2. Go to collegereadiness.collegeboard.org or Khanacademy.org/sat to find four (4) full-length SAT practice forms.
3. Use the *SAT Math Test Domains* handout (pp. 42–44) to compare the content domains with the questions on the test forms. Identify the types of questions used to assess the content and skills in the test specifications.
4. Gather question stems from various content areas and practice writing test questions similar to those used on the SAT practice forms.