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| **Unit 10: Reviewing SAT Mathematics Strategies**In this unit, students examine specific strategies on how to approach the mathematics sections of the SAT.  |
| **Lesson 1, SAT Mathematics Basics** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Format of mathematics sections of SAT
* General strategies
* Types of responses
 | * ***Chalk Talk Protocol***
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 277-281*
* ***Lesson 12 Recap***
* ***My Academic Goals***
* SAT Online Course (College Board) Lesson 12
* ***Weekly Check-In Template***
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| Lesson 1, SAT Mathematics Basics: To access students’ prior knowledge about testing strategies, ask learners to silently brainstorm as many testing strategies that they already know, currently use, or have recently learned in prior lessons. Using a process similar to a **Chalk Talk Protocol**, provide each student with a marker and have them record their thoughts on a large sheet of chart paper. If they notice another student has already listed one of their ideas, they may choose to put a check mark by that idea rather than write it again. Students who see connections between their ideas and someone else’s may choose to draw arrows between the strategies. At the conclusion of the activity, highlight student comments. Explain that many of the strategies they already use will continue to be helpful on the SAT. One facet of the SAT that may be new to some of the students regards the restriction of time. The test strategies explained in the following sections will not only aid students in choosing correct answers, but will help them to be mindful about ways to find the correct answers quickly. If needed, additional information is available in the Kaplan text on pp. 277-281.Direct students to the SAT Online Course (College Board) Lesson 12. Students should read through the lesson pages. At the conclusion of Lesson 12, provide students with the ***Lesson 12 Recap*** document so they may annotate the strategies as things they already do, need to do, or learned to do in prior lessons.Have students review their long-range, mid-range, and short-range goals (From Unit 1, Lesson 2) from the ***My Academic Goals*** worksheet. Using the ***Weekly Check-In Template***, have students create new weekly and monthly goals to reflect their annotations from the ***Lesson 12 Recap.*** Encourage students to create action steps that will assist them to reach these goals.  |

| **Lesson 2, Strategies for Answering Multiple-Choice Questions** |
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| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Eliminating unreasonable answers
* Eliminating the obvious
* Eyeballing measurements
* Picking values
* Working backwards
 | * ***Checkpoints***
* ***Do I Really Get It***
* ***Exit Ticket***
* ***Images for Backsolving***
* ***Images for Picking Numbers***
* ***Images for Picking Numbers and Backsolving***
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 281 -300*
* ***Let’s Talk***
* SAT Online Course (College Board) Lesson 13
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| Lesson 2, Strategies for Answering Multiple-Choice Questions: Display ***Images of Picking Numbers and Backsolving*** (using either the PowerPoint or pdf resources). Engage students in structured, authentic academic discourse via the ***Let’s Talk*** Literacy Routine. After thinking silently ask students to signal when they have an answer to the question for each slide: “What do the images have in common?” Students should answer using the sentence stem “These images all depict \_\_\_\_\_”. Cold call students to share their responses. Explain the two main strategies for conquering multiple-choice questions in the mathematics sections of the SAT are to “Pick Numbers” and “Backsolve”. These images will help them to remember these strategies.Allow students time to independently read and use sticky notes to annotate Kaplan pp. 281-287 regarding Two Effective Techniques for Multiple-Choice Questions. (Similar information is available in the SAT Online Course (College Board) Lesson 13.) The section in the Kaplan text emphasizes types of problems that can be solved when students substitute values into the question (Picking Numbers) or utilize working backwards from the answer choices (Backsolving). Utilize the ***Do I Really Get It*** Literacy Routine to check for understanding of the whole group. Partner students and allow them 2 minutes to quickly review the 10 multiple-choice questions on pp. 299-300 of the Kaplan text. Circulate around the room and listen as students determine which questions could be strategically solved by “picking numbers” or “backsolving”. At this ***Checkpoint***, call on student pairs to share one of their strategic approaches to the questions. Allow students to solve these chosen problems.Returning student attention to the Kaplan text pp. 287-291, have students continue reading and annotating Strategies for Guessing on Multiple-Choice Questions. At the conclusion of this section, students should use their new strategies to complete the multiple-choice problems 1-10 on pp. 299-300. Continuing the use of the ***Do I Really Get It*** Literacy Routine, have students write an ***Exit Ticket*** explaining which strategy they used to solve one of the multiple-choice SAT problems. |
| **Lesson 3, Strategies for Answering Grid Questions** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Calculator use
* Directions
* Gridding decimals
* Gridding fractions
* Guessing
* Multiple answers
* Where to start
* Writing and gridding answers
 | * ***Comparing Grids***
* ***Exit Ticket***
* ***Grid Practice Game***
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 291 – 305*
* ***SAT Grid Answer Sheet***
* SAT Online Course (College Board) Lesson14
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| Lesson 3, Strategies for Answering Grid Questions: Have students compare and contrast the two images provided in the ***Comparing Grids.*** The first image is from STAAR EOC tests and the second image is what students will use to record student-produced responses on the SAT. If students struggle with the comparison, use prompting questions: Do both grids allow you to enter positive or negative numbers? Do both grids allow you to enter fractions? Do both grids allow you to enter decimals? What is the limit on the size of the numbers that can be recorded?Remind students that one way to save time during the SAT is to be familiar with the directions prior to testing time. The grid-in section of the SAT is similar to other tests that require student-produced responses, but there are important differences such as no negative answers, no mixed numbers, and fractions do not need to be simplified. Allow students time to independently read and annotate the Kaplan text pp. 291-298 or the SAT Online Course (College Board) Lesson 14. Have students practice the strategies for grid-in answers using the ***Grid Practice Game***: Pass out ***SAT Grid Answer Sheets*** to the students. Project the list of 10 answers for students to grid onto the answer sheets from the ***Grid Practice Game***. At the end of 3 minutes, have students put their pencils down. Allow students to exchange papers and discuss possible responses. Remind students the goal is to accurately and quickly enter responses. Because incorrect grid responses are not penalized, it is crucial that students always attempt a response for these questions. If needed, repeat the ***Grid Practice Game***. Students complete an ***Exit Ticket*** in response to the prompt: Explain how you would record the answer 21/12 on the SAT student-produced response grid. |

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| **Unit 11: Introductory Mathematics Concepts (Simultaneous Equations, Symbols, Ratio, Rate, Remainders, Averages, Percentages)**In this unit, students review the mathematical content assessed by the SAT. This unit serves as a refresher of the content as well as addressing specific testing strategies for mathematics.  |
| **Lesson 1, General Arithmetic Skills and Concepts** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 2 Classes | * Number and operations
 | * College Board Online Lesson 15
* ***Quiz, Quiz, Trade Activity***
* ***T-Chart***
* ***Think Aloud***
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| Lesson 1, General Arithmetic Skills and Concepts: In this lesson, students review the basic terminology, skills, and concepts assessed by many of the problems in the mathematics portion of the SAT. In fact, these topics constitute many of the easy to medium-level questions that appear on the test. Have students access the College Board Online Lesson 15 tutorial and begin to take notes about topics they are unfamiliar with. Students can record their notes in a ***T-Chart*** to refer back to later. Have students label one column Skill or Concept and the second column Examples. Model placing one concept in the left column and then writing the corresponding example in the right column. Using a ***Think-Aloud*** model, illustrate how to personalize the information by noting common errors or points of confusion. For instance, students may not realize that an additional way to denote consecutive integers is to use *n, n+1, n+2*, etc. They might also choose to record common misunderstandings of definitions (such as the fact that one is not considered a prime number). Lesson 15 contains a substantial amount of information and may take a significant amount of time to review. For practice utilizing the information in Lesson 15, have students complete the set of sample questions available at the conclusion of the lesson. Provide each student with two index cards. As students work through the sample questions, have them record the two most difficult problems they encounter within the set on the index cards. To close the lesson, students will engage in the ***Quiz, Quiz, Trade*** activity using one of the recorded problems they have chosen as difficult for them. To further assess student understanding and reinforce these general arithmetic skills, students should take the College Board Online Lesson 15 quiz. |

| **Lesson 2, Solving Simultaneous Equations** |
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| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Simultaneous equations
 | * *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 308-309*
* Naviance PrepMe Lesson: Simultaneous Equations (Math-Algebra section)
* SAS Curriculum Pathways (works best in Internet Explorer)
	+ Alg 1 Course Unit 3, Lesson 5 (QL#5045)
	+ Alg 1 Course Unit 3, Lesson 6 (QL#5046)
	+ Alg 1 Course Unit 3, Lesson 7 (QL#5047)
	+ Interactive Tool: Solving Linear Systems (QL#1449)
* ***Simultaneous Equations Review***
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| Lesson 2, Solving Simultaneous Equations: Have students read the suggestions for solving systems of equations using the Kaplan text pp. 308-309. Emphasize the short cut strategy in the example problems on top of p. 309. This type of time saving procedure helps students to solve systems *quickly.* If needed, the Naviance PrepMe Lesson: Simultaneous Equations (Math-Algebra section) provides greater depth regarding the process of solving systems of equations. To practice solving systems of equations using the strategies, have students complete the ***Simultaneous Equations Review***. Notice in the activity directions that two options are available for engaging students in this task.Suggestions for struggling students: Although students learned to solve systems of equations in algebra 1, they may still struggle with the concept. If needed additional guidance or tutoring regarding solving systems of equations beyond the Naviance PrepMe Lesson: Simultaneous Equations, have them access the SAS Curriculum Pathway lessons listed in the resources. |

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| **Lesson 3, Symbols** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Special symbol operations
 | * ***Exit Ticket***
* *Kaplan SAT Strategies, Practice, and Review, 2015*  ***p****p. 309-310*
* Naviance PrepMe Lesson: Special Symbol Operations (Math-Algebra section)
* ***Symbols Exit Ticket***
* ***Symbols Round Robin Relay Game***
* ***Symbols Warm-Up***
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| Lesson 3, Symbols: Symbols are important in a multi-lingual world. To introduce students to the concept that icons represent functions, have them complete the ***Symbols Warm-Up*** that asks them to identify the cell phone function represented by each of the depicted symbols. After reviewing the ***Symbols Warm-Up*** answers, stress that just as these symbols or icons represent functions that cell phones will conduct, the SAT uses special symbols to represent functions beyond the typical addition, subtraction, multiplication, and division. Use the Naviance PrepMe Lesson: Special Symbol Operations to show students how College Board assesses this concept on the SAT. At the conclusion of the PrepMe lesson, students attempt a special symbol problem. For additional examples and explanation, direct them to the Kaplan text on pp. 309-310. Inform students College Board designates these questions as “medium” or “hard” because so many students are confused by the strange symbols. The ***Symbols Round Robin Relay Game*** allows groups to practice some of these questions in a fast-paced manner that stresses efficiency and accuracy. At the conclusion of the game, assess individual student understanding using the ***Symbols Exit Ticket***. |

| **Lesson 4, Ratio** |
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| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class(if students have a working knowledge of ratios)2 Classes(if students need remediation) | * Ratio
 | * College Board Online Lesson 15 topic 8: Ratios, Proportions, and Percents
* *Kaplan SAT Strategies, Practice, and Review, 2015* pp. 314-316
* [Khan Academy Video Lesson Introduction to Ratios](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/introduction-to-ratios-new-hd-version%20https%3A/www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/introduction-to-ratios-new-hd-version)
* [Khan Academy: Ratio Word Problems](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/e/ratio_word_problems)
* [Khan Academy Video Lesson Ratio Word Problem: Boys to Girls](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/ratio-word-problem-exercise-example-1)
* Naviance PrepMe Lesson: Ratios (Math-Algebra section)
* ***Pen/cil to Paper***
* ***Quick Write***
* ***Ratios Exit Ticket***
* ***Ratio Problems of Special Note***
* ***Ratios Warm-Up***
* ***Tic-Tac-Toe***
* ***Tic-Tac-Toe SOLUTIONS***
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| Lesson 4, Ratio: As students enter class, have them read Kaplan pp. 314-316 to review definitions and problems involving ratios. Students are first introduced to the concept of ratio and proportion in 6th grade and need a chance to review and reflect over knowledge that may be deeply buried. Next, have students complete the ***Ratio Warm-Up*** problems. Students should self-check their answer responses and reflect upon their mastery or readiness for reviewing the concept of ratios. For instance, if students correctly answered questions 1 and 2, then they understand that cross multiplication and division are key steps for solving problems involving ratios and proportions. If students answered questions 3 and 4 correctly, they possess a deeper understanding of ratios and are prepared to tackle more difficult problems. To assist students with reflecting on their understanding of ratios, utilize the ***Pen/cil to Paper*** Literacy Routine. Prompt students to consider the potential pitfalls associated with SAT ratio questions that were discussed in the Kaplan text. For instance, did they miss any of the warm-up problems because they did not carefully note what the question was asking? Ask students to produce a ***Quick Write*** to summarize what they remember about ratios and proportions. The ***Quick Write*** should also include a self-reflection about how well they think they understand ratios (really well, well, poorly).As all questions on the SAT, ratio problems range from easy to difficult. Depending upon student mastery/readiness, the following options are suggested: * For students with weak ratio skills,
* Begin review with College Board Online Lesson 15, topic 8. The slides include basic definitions and two introductory problems.
* Next, watch all 14 minutes of the Khan Academy video: Introduction to Ratios. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/introduction-to-ratios-new-hd-version](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/introduction-to-ratios-new-hd-version)
* Progress to the Khan Academy video Ratio Word Problem video: Boys to Girls (2 min). [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/ratio-word-problem-exercise-example-1](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/ratio-word-problem-exercise-example-1)
* Try 5 practice problems on Khan Academy: Ratio Word Problems. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/e/ratio\_word\_problems](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/e/ratio_word_problems)
* Advance to more difficult problems on Naviance PrepMe Lesson Ratios(Math-Algebra section) - 37 slides. Within the explanations, students are encouraged to use the “Picking Numbers” strategy to find solutions and are provided with four difficult practice problems (explanations included).
* For students with mid-level ratio skills,
* Begin watching the Khan Academy video: Introduction to Ratios. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/introduction-to-ratios-new-hd-version](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/introduction-to-ratios-new-hd-version) – start at 6:45. This allows students to skip the introductory section and focus on the mid-level problem explanations.
* If needed, progress to the Khan Academy video Ratio Word Problem video: Boys to Girls (2 min). [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/ratio-word-problem-exercise-example-1](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/ratio-word-problem-exercise-example-1)
* If needed, try 5 practice problems on Khan Academy: Ratio Word Problems. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/e/ratio\_word\_problems](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/e/ratio_word_problems)
* Advance to more difficult problems on Naviance PrepMe Lesson Ratios(Math-Algebra section) - 37 slides. Within the explanations, students are encouraged to use the “Picking Numbers” strategy to find solutions and are provided with four difficult practice problems (explanations included).
* For students with strong ratio skills,
* Begin watching the Khan Academy video: Introduction to Ratios. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/introduction-to-ratios-new-hd-version](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/introduction-to-ratios-new-hd-version) – start at 11:08. This allows students to focus on the most difficult problem situations.
* If needed, progress to the Khan Academy video Ratio Word Problem video: Boys to Girls (2 min). [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/v/ratio-word-problem-exercise-example-1](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/v/ratio-word-problem-exercise-example-1)
* If needed, try 5 practice problems on Khan Academy: Ratio Word Problems. [www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios\_and\_proportions/e/ratio\_word\_problems](http://www.khanacademy.org/math/pre-algebra/rates-and-ratios/ratios_and_proportions/e/ratio_word_problems)
* Advance to more difficult problems on Naviance PrepMe Lesson Ratios(Math-Algebra section) -37 slides. Within the explanations, students are encouraged to use the “Picking Numbers” strategy to find solutions and are provided with four difficult practice problems (explanations included).

Divide students into pairs to play ***Tic-Tac-Toe*** using ratio problems to earn the right to mark a square. The boards consist of tiered levels of questions. Allow students the chance to choose at which level they would like to begin work (easy, medium, hard). As students check their answers, note if there are particular question blocks that students avoid. Also note if students repeatedly miss the same question block. These questions hold opportunities for a whole-class discussion or explanation. If necessary, students can reference the Khan Academy video and the Naviance PrepMe video for assistance with solving the problems. The ***Ratios Exit Ticket*** assesses student mastery of easy and medium problems while reinforcing skills needed for student-produced responses (grid-ins).***Ratio Problems of Special Note*** focus on a particular type of problem that causes students confusion and difficulty. If time permits, share the problems and solutions with students. |

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| **Lesson 5, Rate** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Rate
 | * *Kaplan SAT Strategies, Practice, and Review, 2015* pp. 316-318
* Naviance Prep Me Lesson: Motion, Distance, and Rate (Math-Arithmetic section)
* ***Rates Cut-A-Parts***
* ***Rates Cut-A-Parts SOLUTIONS***
* ***Rates Guided Notes Sheet***
* ***Rates Warm Up***
* ***Tricky SAT Motion Problems***
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| Lesson 5, Rate: Rates are a special type of ratio because they compare quantities that have different units. Familiar rates include miles per hour, revolutions per second, or dollars per item. The main types of problems students encounter on the SAT include unit cost problems and motion problems. Caution students to monitor the alignment of units when setting up these problems. It does not help if one side of the problem has expressed time in seconds while the other side has time listed in hours. As students enter class, they should read the Kaplan text pp. 316 – 318. Then use the ***Rates Warm Up*** problems to introduce students to how the SAT will assess basic rate problems. Further elaboration and three additional practice problems about rates are available in the Naviance PrepMe Lesson: Motion, Distance, and Rate. The three problems presented in the PrepMe Lesson introduce students to the different ways to assess knowledge of this topic beyond the basic level questions. As with all of the mathematics topics, problems range from easy to difficult. The difficult motion problems may include tricky ways to account for time or distance. The ***Tricky SAT Motion Problems*** PowerPoint chunks four of the most common types of problems students might encounter on the SAT. The ***Rates Guided Notes Sheet*** provides a graphic organizer that may be utilized with the PowerPoint. Encourage students to use the illustrations of each problem type to determine solutions. The ***Rates Cut-A-Parts*** provides students with additional practice on these more difficult problems (if possible, print the cards on colored paper). To complete the activity, students will need notebook paper, scissors, and glue sticks or tape. |
| **Lesson 6, Remainders** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Remainders
 | * *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 318-319*
* Naviance PrepMe Lesson: Plug and Chug (under Math-Algebra section)
* Naviance PrepMe Lesson: Use Examples (under Math-Algebra section)
* ***Pen/cil to Paper***
* ***Remainders Exit Ticket Paragraph Frame***
* ***Remainders Foldable Notes***
* ***Remainders Foldable Notes SAMPLE***
* ***Remainders Practice***
* ***Remainders Practice SOLUTIONS***
* ***Remainders Warm-Up***
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| Lesson 6, Remainders: The ***Remainders Warm-Up*** utilizes vocabulary from outside of mathematics to engage students’ understanding of remainders. Students encounter the concept of remainder beginning in third or fourth grade, so they may need a refresher on the terminology. For instance, if 15 is divided by 7, then 15 is the dividend and 7 is the divisor. Because 7 can divide into 15 two full times, 2 is the quotient. The leftover amount of 1 is the remainder (it remains after 7\*2 or 14 is taken out of 15). The most important terms students need to remember are divisor and remainder. When considering 15 divided by 7, 7 is the divisor and 1 is the remainder of that process. Remainder problems commonly found on the SAT fall into one of three methods for solution: Picking numbers, using the answers, and looking for patterns. As mentioned earlier, picking numbers works well for problems that involve even/odd numbers or problems with variable expressions. Also, remember that backsolving uses the answer choices to help find the solution. Because answer choices on the SAT are arranged in either ascending or descending order, beginning with answer choice C is the most efficient way to approach the problem. Problems that involve patterns sometimes conceal remainder questions. Have students silently read the Kaplan text pp. 318-319 for explicit examples of remainder problems on the SAT. Use the ***Remainders Foldable Notes*** to provide students with examples of each type of problem. Follow the provided directions and refer to the ***Remainders Foldable Notes SAMPLE*** as needed. Remind students that the goal is to solve remainder problems *quickly*. Targeting which method is most efficient will save valuable time on test day. Students complete the ***Remainders Practice*** including identification of the method they chose for solution. The ***Pen/cil to Paper*** Routine provides students with an opportunity to reflect on their learning and assess their understanding of a topic through informal writing. As a closing activity, utilize this routine by asking students to write three sentences to explain how to identify the method needed for solving remainder problems on the SAT. For students who need assistance, use the ***Remainders Exit Ticket Paragraph Frame***.The Naviance PrepMe Lessons: Use Examples and Plug and Chug may be used to reinforce the pick numbers method and the backsolving/using answers method (respectively). Although the sample problems in the lessons are not remainder problems, the suggested solution strategies are the same.  |
| **Lesson 7, Averages**  |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Average (Arithmetic Mean)
* Median
* Mode
 | * ***Averages Exit Ticket***
* ***Averages Exit Ticket SOLUTIONS***
* ***Averages Notes***
* College Board Online Lesson 18, Topic 4: Statistics
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 319-320*
* Naviance PrepMe Lesson: Averages(Math-Algebra section)
* ***Winterland Game Blue Ice Qs Averages*** (also Lesson 9)
* ***Winterland Game White Snow Qs Averages*** (also Lesson 9)
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| Lesson 7, Averages: Similar to the concept of remainders, students have been working with averages (or means) and percentages for several years. Typically, students first encounter both topics in the sixth grade. Have students begin class by accessing the SAT Online Lesson 18 Topic 4: Statistics and then recording notes about definitions and terms they feel are important to remember. For instance, students may be familiar with the traditional average formula, but the lesson also suggests an alternative version of the formula. Project the ***Averages Notes*** to draw attention to the alternative formulas (blue boxes). Some students may choose to write down both of these formulas in their SAT notebooks. The online lesson also discusses a second type of average problem which may be unfamiliar to students. A weighted average is the average of two or more sets of numbers that do not contain the same number of values. To find the weighted average of two or more sets of numbers: (1) multiply the average of each set by the number of values in that set, and add the products; then (2) divide the sum of the products by the total number of values in all of the sets. Again, project the ***Averages Notes*** to emphasize this formula (written steps are included as well). Also reviewed within the online lesson are definitions of mode and median. Have students practice problems using these concepts with the Naviance PrepMe Lesson: Averages (under the Math – Algebra section). For struggling students, an additional explanation and two more examples are available in the Kaplan book on pp. 319-320. As an Exit Ticket, have students complete the error analysis explanation for the ***Averages Exit Ticket*.** This Exit Ticket focuses on weighted averages. Students who have difficulty identifying this type of problem should be referred to the image of the tug-of-war picture. One group in the average problem has 20 people while the other group has 30 people – not a balanced game. The weighted average formula takes these group differences into account.In lesson 9 of this unit, students will practice this skill through competitive games. One of the game choices is the Winterland Game. If you choose to have students play the Winterland Game during lesson 9, then have them complete the Winterland Game questions forAverages now. Separate students into partners. One partner will be responsible for working the ***Winterland Game White Snow Qs Averages*** and the other partner will be responsible for working the ***Winterland Game Blue Ice Qs Averages*.** Partners will check each other’s’ answers. If you choose to use the X-factor game or Trashketball, then do not have students complete the problems at this time.  |
| **Lesson 8, Percentages** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Percentages
 | * *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 321-322*
* [Kuta Fractions, Decimals, and Percent Review](http://cdn.kutasoftware.com/Worksheets/PreAlg/Fractions%20Decimals%20and%20Percents.pdf)
* Naviance PrepMe Lesson Percentages (under the Math-Arithmetic section)
* ***Naviance PrepMe Slide Converting FractionsDecimalsPercent***
* ***Percentages Note Sheet***
* ***Percentages Exit Ticket***
* ***Percentages Exit Ticket SOLUTIONS***
* ***Quick Write***
* ***Winterland Game Blue Ice Qs Percentages*** (also Lesson 9)
* ***Winterland Game White Snow Qs Percentages*** (also Lesson 9)
 |
| Lesson 8, Percentages: As mentioned, the concept of percent should be familiar to the students, but many learners will still need a quick review about how to convert fractions, decimals, and percent. Have students complete the [Kuta Fractions, Decimals, and Percent Review](file://C:\Users\ahowell1\Desktop\2014-2015\SAT%20Prep%20Course\Cycle%203%20documents\In%20lesson%209%20of%20this%20unit,%20students%20will%20practice%20this%20skill%20through%20competitive%20games.%20One%20of%20the%20game%20choices%20is%20the%20Winterland%20Game.%20If%20you%20choose%20to%20have%20students%20play%20the%20Winterland%20Game%20during%20lesson%209,%20then%20have%20them%20complete%20the%20Winterland%20Game%20questions). To minimize the time spent on this warm-up, have students complete only the even numbered problems. Alert students who struggle with the warm-up to record in their SAT notebooks the last slide in the Naviance PrepMe Lesson Percentages (under the Math – Arithmetic section). This slide is a graphic organizer for how to convert among fractions, decimals, and percentages. Next, have students read the Kaplan text pp. 321 – 322. This section reviews the three types of percent problems assessed on the SAT: Looking for the part, looking for the whole, or looking for the percent. *Please note the typing error on p. 322: The process for the solution should read ¼ × ¼ × 72 (the text accidently displays an equal sign).* This problem is also noteworthy because the grid limits the answers students can submit (either 9/2 or 4.5). Using the ***Quick Write*** strategy, ask students to summarize how to solve the three types of percent problems and record their summary in their SAT notebooks (6 minutes). Circulate around the room and note student responses to the prompt. At the close of 6 minutes, ask specific students to share their thoughts. Examples of possible student summaries are located in the ***Percentages Note Sheet***. Remind students that the SAT will use various combinations of these three methods to assess their knowledge of this topic. For practice, have students access the Naviance PrepMe Lesson Percentages(under the Math-Arithmetic section). As an exit ticket, have students complete the error analysis explanation for the ***Percentages Exit Ticket*.** Notice that this Exit Ticket focuses on carefully reading what the question asks (from initial lessons for this unit). In lesson 9 of this unit, students will practice this skill through competitive games. One of the game choices is the Winterland Game. If you choose to have students play the Winterland Game during lesson 9, then have them complete the Winterland Game questions for Percentages now. Separate students into partners. One partner will be responsible for working the ***Winterland Game White Snow Qs Percentages*** and the other partner will be responsible for working the ***Winterland Game Blue Ice Qs Percentages*.** Partners will check each other’s answers. If you choose to use the X-factor game or Trashketball, then do not have students complete the problems at this time.  |
| **Lesson 9, Practicing Average and Percent Problems** |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Average (Arithmetic Mean)
* Mode
* Median
* Percentages
 | * ***Trashketball Directions***
* ***Winterland Game***
* ***Winterland Game Blue Ice Qs Averages***
* ***Winterland Game Blue Ice Qs Percentages***
* ***Winterland Game White Snow Qs Averages***
* ***Winterland Game White Qs Percentages***
* ***X-factor***
 |
| Lesson 9, Practicing Average and Percent Problems: This lesson focuses on extending the students’ calculation skills for averages and percentages. The **WinterLand Game** is similar to Candyland. The goal of each pair of students is to move their sleigh/game piece until they reach the Snow Castle at the end of the board. As students move around the board, they will answer questions involving averages or percentages. If students have completed the Winterland game questions prior to today’s lesson, the activity will proceed faster. However, it is not necessary for students to have completed the worksheets ahead of time. Directions for the ***Winterland Game*** are listed in the PowerPoint that also contains the game board and question cards. To begin, separate students into partners. One partner is responsible for working the ***Winterland Game White Snow Qs for Averages and Percentages*** while the other partner is responsible for working the ***Winterland Game Blue Ice Qs for Averages and Percentages*.** Partners should assist each other with the problems and double check their answers together. Circulate around the room to confirm correct responses or guide students when they experience a difficulty. Students use these answers to check their opponents’ answers when playing the ***Winterland Game***. When complete, one set of partners finds another pair of students with whom to play the game. Provide a game board, cards, two game pieces, and die to the group. Each pair rolls the die – the team that rolls the highest number goes first. The first team now rolls the die to begin play. The first team moves their game piece forward the number of spaces indicated on the die. The type of space they land on will determine which question they will answer. If the team lands on a White Snow location, then they pull a White Snow card and answer the question on that card. If the team lands on a Blue Ice location, then they answer a Blue Ice question. (Remember, the students should already have the problem solutions on their assigned sheets). If the answer provided by the team is confirmed by their opponents, then the team earns that spot. If the answer is incorrect, the team returns to their original location. In other words, a game piece can only advance when questions are answered correctly. After the question response, the second team now takes their turn at play. Game action alternates between teams after each question. If the answer to a question is debated, both sets of partners should work the problem again – together – to determine the correct solution. As alternatives to the Winterland Game, the ***Winterland Game Blue Ice*** ***Qs*** and ***Winterland Game*** ***White Snow Qs*** may be used to play games such as **X-factor** or **Trashketball**. Both of these games are more competitive and faster paced than the ***Winterland Game*** and would meet the needs of students who possess strong skills with these concepts. |

| **Lesson 10, Review of Arithmetic Skills** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Review of arithmetic skills
	+ Averages
	+ Percentages
	+ Rate
	+ Ratio
	+ Remainders
	+ Simultaneous Equations
	+ Symbols
* Review of test-taking skills
	+ Multiple-choice responses
 | * ***College Board Number Operations Lesson***
* ***My Academic Goals***
* ***Weekly Check-In Template***
 |
| Lesson 10, Review of Arithmetic Skills: Use the ***College Board Number Operations Lesson*** to have students reflect on the mathematical topics and test-taking skills from this cycle. The lesson utilizes the mathematical content to focus student attention on erroneous distractors found within multiple-choice questions. To introduce the lesson, students are asked to review basic information about the mathematics sections: * How many multiple choice questions are in each section?
* How many choices does each section contain?
* How much is each correct answer worth?
* How much is each incorrect choice worth?
* Are the problems presented in order of difficulty?

 Model solving the two provided sample problems and allow students to practice the challenging problem with a partner. In groups of four, students play the “Multiple-Choice Minute” activity. In closing, have students take the provided lesson quiz.After the activity, share answers with the students and have them review their long-range, mid-range, and short-range goals (From Unit 1, Lesson 2) from the ***My Academic Goals*** worksheet. Using the ***Weekly Check-In Template***, have students create new weekly and monthly goals to reflect their mastery level of these skills and concepts***.*** Encourage students to create action steps that will assist them to reach these goals.  |

|  |
| --- |
| **Unit 12: Geometric Topics (Angles and Triangles, Special Right Triangles, Multiple Figures, and Geometric Probability)**In this unit, students review geometric concepts assessed by the SAT. This unit serves as a refresher of the content as well as addressing specific testing strategies for mathematics. |

| **Lesson 1, Angles and Triangles, part 1** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Angles within parallel lines
* Angles within special triangles
* General angle relationships
* Pythagorean Theorem
* Segments within triangles
 | * ***Angles and Triangles Notes***
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 310-311*
* ***Khan Academy Practice Problems***
* [Khan Academy Video Lesson: Triangle Inequality Theorem](https://www.khanacademy.org/math/geometry/basic-geometry/triangle_inequality_theorem/v/triangle-inqequality-theorem)
* Naviance Prep Me Lesson: Angles (Math-Geometry section)
* ***Quick Write***
* *SAT Online Course (College Board) Lesson 17, Topic 4: Angles in the Plane*
 |
| Lesson 1, Angles and Triangles: In this lesson, students review the initial geometric definitions and calculations for types of angles and triangles. Many students began learning this information in middle school, but it is also a component of high school geometry. To pre-assess student mastery of these topics, use a ***Quick Write*** (6 minutes) to have students answer: *What are the different types of angles and some special angle pairs? Answer this question by listing the types of angles and special pairs using correct geometric vocabulary*. As students record their ***Quick Write*** in their SAT notebooks, circulate around the room to prompt students who seem to be struggling. Possible questions to ask include: * Do you know anything about angles that sit next to each other on a line?
* What about angles that sit next to each other and make a corner (90 degree angle)?
* Do you know anything about the angles in triangles?
* What if angles fall within a set of parallel lines?

Or, praise a student who has begun to list these types of angles and use the praise statement as a means of prompting his/her classmates. For instance, congratulate a student by remarking, “Very clever thinking, Mary, a lot of people would have forgotten to include what they know about angles in parallel lines.” At the conclusion of the ***Quick Write,*** have students view the Naviance PrepMe Lesson: Angles (in the Math-Geometry Section) and read the Kaplan text pp. 310-311. Students should add any missing types of angles to their ***Quick Write***. Another source of information is the SAT Online Course (College Board) Lesson 17, Topic 4: Angles in the Plane. A summary of the important concepts from these resources is contained in the ***Angles and Triangles Notes.*** One important piece of information missing from the lessons regards the Triangle Inequality Theorem. The blue box on the ***Angles and Triangles Notes*** illustrates the Triangle Inequality Theorem. Display this information for students to record in their notes. If students are confused or need further explanation, direct them to watch the Khan Academy video lesson: Triangle Inequality Theorem found at: [*https://www.khanacademy.org/math/geometry/basic-geometry/triangle\_inequality\_theorem/v/triangle-inqequality-theorem*](https://www.khanacademy.org/math/geometry/basic-geometry/triangle_inequality_theorem/v/triangle-inqequality-theorem)For practice, students should complete the ***Khan Academy Practice Problems***. Each of these problems aligns with a Khan Academy video that explains how to solve the problem so that students may check their work after they have finished. Emphasize that the SAT often embeds the assessment of these angle concepts within other types of problems. Quick, accurate recall of these angle relationships makes available time for more difficult problems or for checking answers.  |

| **Lesson 2, Angles and Triangles, part 2** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 Class | * Angles within parallel lines
* Angles within special triangles
* General angle relationships
* Pythagorean Theorem
* Segments within triangles
 | * ***Angles and Triangles Jeopardy***
* ***Angles and Triangles Supplementary Lessons***
* ***Jeopardy Directions***
* [Khan Academy Video Lesson: Angles (part 2)](http://www.khanacademy.org/math/geometry/parallel-and-perpendicular-lines/old_angles/v/angles-part-2)
* [*Khan Academy Video Lesson: Angles (part 3)*](http://www.khanacademy.org/math/geometry/parallel-and-perpendicular-lines/old_angles/v/angles-part-3)
* [*Khan Academy: Finding angle measures 1*](http://www.khanacademy.org/math/geometry/parallel-and-perpendicular-lines/triang_prop_tut/e/angles_1)
* [*Khan Academy: Finding angle measures 2*](http://www.khanacademy.org/math/geometry/parallel-and-perpendicular-lines/triang_prop_tut/e/angles_2)
* [*Khan Academy Video Lesson: Equilateral and Isosceles Example Problem*](http://www.khanacademy.org/math/geometry/congruent-triangles/isoscleles_equil/v/equilateral-and-isosceles-example-problems)
* [*Khan Academy Video Lesson: Pythagorean Theorem*](http://www.khanacademy.org/math/geometry/right_triangles_topic/pyth_theor/v/pythagorean-theorem)
* [Kuta WS Angles in a Triangle](http://cdn.kutasoftware.com/Worksheets/Geo/4-Angles%20in%20a%20Triangle.pdf)
* [Kuta WS Isosceles and Equilateral Triangles](http://cdn.kutasoftware.com/Worksheets/Geo/4-Isosceles%20and%20Equilateral%20Triangles.pdf)
* [Kuta WS Triangle Inequailty Theorem](http://cdn.kutasoftware.com/Worksheets/Geo/5-The%20Triangle%20Inequality%20Theorem.pdf)
* [Kuta WS Ordering Sides in Triangle – Inequality Thm](http://cdn.kutasoftware.com/Worksheets/Geo/5-Inequalities%20in%20One%20Triangle.pdf)
* [Kuta WS Pythagorean Theorem](http://cdn.kutasoftware.com/Worksheets/Geo/8-The%20Pythagorean%20Theorem%20and%20Its%20Converse.pdf)
* SAS Curriculum Pathways (works best in Internet Explorer)
	+ Geometry Inquiry: Angles, Angles, and More Angles (QL#105)
	+ Interactive Tool: Triangles: Interiors and Exteriors (QL#1435)
	+ Interactive Tool: Parallel Lines: Special Angles(QL#1439)
	+ Audio Tutorial: Pythagorean Theorem (QL#1351)
* ***Stand Up Hands Up Pair Up***
* [Teacher Tube: Geo ScreenCast: Pythagorean Theorem](http://www.teachertube.com/video/geo-screencast-pythagorean-theorem-1238)
* [TeacherTube: Lesson 3-3: Triangle Inequality](http://www.teachertube.com/video/lesson-3-3-triangle-inequalities-11919)
 |
| Lesson 2, Angle and Triangles Jeopardy: Hang a large piece of poster paper on the wall and a marker. As students enter the room, have them write down one important relationship or fact about angles or triangles. Students should not repeat an idea that has already been written on the poster. Next, separate the class into teams for playing Jeopardy. Use the ***Angles and Triangles Jeopardy*** PowerPoint to provide SAT type questions about angles and triangles. The ***Jeopardy Directions*** include suggested variations that encourage all students to actively participate in the game. Although the Jeopardy questions are not multiple-choice, the question stems are aligned with how these topics are assessed by the SAT. The topics include: Angles of Special Triangles, Pythagorean Theorem, General Angle Questions, Segments in Triangles, and Angles in Parallel Lines. When using the PowerPoint, click on the dollar amount under the category that a group selects. After the group has provided an answer in the form of a question, use the “arrow right” key [►] or the “arrow down” key [▼] to reveal the correct response. Remember to subtract points if the student group is incorrect. After each question, click on the button in the bottom right corner to return to the Jeopardy home page. If the arrow keys are clicked after displaying the answer (in the form of a question), it will reveal the next question – avoid this. At the conclusion of final Jeopardy, students should reflect on their personal understanding of the categories. Using the ***Stand Up Hands Up Pair Up*** strategy, allow the students 4 minutes to consider which category they understood the best and in which one they need more practice.For students that need additional support or practice, refer to the ***Angles and Triangles Supplementary Lessons*** document***.*** |

| **Lessons 3, Special Right Triangles, part 1** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * 30-60-90 Triangles
* 45-45-90 Triangles
 | * ***30\_60\_90 Triangles Solved With Ratios***
* ***45\_45\_90 Triangles Solved With Ratios***
* ***Do I Really Get It***
* *Kaplan SAT Strategies, Practice, and Review, 2015*
	+ *pp. 312-314*
	+ *p. 400*
* [Khan Academy Video Lesson: Triangle side ratios](http://www.khanacademy.org/math/geometry/right_triangles_topic/special_right_triangles/v/45-45-90-triangle-side-ratios)
* [Khan Academy:Special right triangles](http://www.khanacademy.org/math/geometry/right_triangles_topic/special_right_triangles/e/pythagorean_theorem_2)
* [Khan Academy Video Lesson:Simplifying radicals](http://www.khanacademy.org/math/pre-algebra/exponents-radicals/radical-radicals/v/simplifying-radicals)
* [Khan Academy Video Lesson:Simplifying square roots](http://www.khanacademy.org/math/pre-algebra/exponents-radicals/radical-radicals/v/simplifying-square-roots-1)
* [Khan Academy:Simplifying square roots](http://www.khanacademy.org/math/algebra/exponent-equations/simplifying-radical-expressions/e/simplifying_radicals)
* [Khan Academy:Simplifying square roots 2](http://www.khanacademy.org/math/algebra/exponent-equations/simplifying-radical-expressions/e/multiplying_radicals)
* [Khan Academy Video Lesson:How to rationalize a denominator](http://www.khanacademy.org/math/algebra/exponent-equations/simplifying-radical-expressions/v/how-to-rationalize-a-denominator)
* [Kuta WS Dividing and Rationalizing Radicals](http://cdn.kutasoftware.com/Worksheets/Alg1/Dividing%20Radical%20Expressions.pdf)
* [Kuta WS Dividing and Square Roots](http://cdn.kutasoftware.com/Worksheets/Geo/1-Dividing%20and%20Square%20Roots.pdf)
* [Kuta WS Multi-Step Special Right Triangles](http://cdn.kutasoftware.com/Worksheets/Geo/8-Multi-Step%20Special%20Right%20Triangles.pdf)
* [Kuta WS Multiplying Square Roots](http://cdn.kutasoftware.com/Worksheets/Geo/1-Multiplying%20Square%20Roots.pdf)
* [Kuta WS Special Right Triangles](http://cdn.kutasoftware.com/Worksheets/Geo/8-Special%20Right%20Triangles.pdf)
* ***Quick Write***
* ***Special Right Triangles Supplementary Lessons***
* ***Special Right Triangles Warm Up***
* ***Special Right Triangles Warm Up SOLUTIONS***
* [Teacher Tube: Geo ScreenCast: Special Triangles](file:///C%3A%5CUsers%5Cahowell1%5CDesktop%5C2014-2015%5CSAT%20Prep%20Course%5CCycle%203%20documents%5C.%20www.teachertube.com%5Cvideo%5Cgeo-screencast-special-triangles-1410)
* [Teacher Tube: Special Right Triangles](http://www.teachertube.com/video/special-right-triangles-26617)
* [Teacher Tube: Math Help-Algebra-Multiplying Radicals](http://www.teachertube.com/video/math-help-algebra-multiplying-radicals-17833)
* [Teacher Tube: Rationalizing the Denominator Rational Fractions](http://www.teachertube.com/video/rationalizing-the-denominator-radical-fractions-22707)
 |
| Lesson 3, Special Right Triangles Review: Quickly solving for the lengths of special right triangles is essential for performing well on the SAT. Special right triangles are often hidden inside complex figures or can be obtained by inserting additional lines into a figure. A goal for students should include the ability to solve special right triangles without performing written calculations. In this lesson, students will review three different methods for solution. The ratios associated with special right triangles do not need to be memorized. Embedded within the directions and information portion of each mathematics section is an illustration labeled with the ratios. As mentioned in previous lessons, students will save time on the day of the test if they are already familiar with the directions and information portions of each section. As students enter the room, have them read the Kaplan text pp. 312 – 314 to refresh their minds about special right triangles. After students finish reading the pages, direct them to p. 400 in the Kaplan text. Emphasize how important familiarity with the directions and information sections is for saving time on test day. Also bring to their attention the special right triangle illustrations in the information bar. To pre-assess students’ levels of mastery, have the learners complete the ***Special Right Triangles Warm-Up***. Designate a time limit for completion of the warm-up and when time expires, display the ***Special Right Triangles Warm-Up SOLUTIONS.*** The warm-up is designed to give students and teachers a quick snapshot of strengths and potential areas for learning. * If students did not answer questions 1 or 2 correctly, they probably have difficulty with the entire concept of solving special right triangles.
* If students answered 1 and 2 correctly, but missed problems 3 and 4, then they have an understanding of how to solve special right triangles but possibly struggle with operations that involve radicals (square roots).
* If students get the odd-numbered problems correct, then they are familiar with 45-45-90 triangles.
* If students get the even-numbered problems correct, then they are familiar with 30-60-90 triangles.

Share this analysis with students and then ask them to use a ***Quick Write*** to construct a reflection for the question: How well do you understand special right triangles? Post sentence stems to prompt students to consider areas for growth, such as: I understand the concepts of how to solve special right triangles, but I would like to improve upon \_\_\_\_. I understand 45-45-90 triangles, but I would like to improve upon \_\_\_\_\_. I understand 30-60-90 triangles, but I would like to improve upon \_\_\_\_. Possible responses that students might consider include how to be faster, how to use short-cuts, how to feel more comfortable with using radicals, etc. Reflecting on tiered questions (like the ones in the warm-up) utilizes the ***Do I Really Get It*** Literacy Routine to help teachers and students identify and monitor points of confusion. Use student responses to determine the best option for developing mastery of solving special right triangles. Suggestions for differentiation are listed in the ***Special Right Triangles Supplementary Lessons***. |

| **Lesson 4, Special Right Triangles, part 2** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * 30-60-90 Triangles
* 45-45-90 Triangles
 | * [Kahoot: Special Right Triangles SAT Practice](https://getkahoot.com/)
* ***Non-Verbal Signals***
* ***Running Roster***
* ***Special Right Triangles Baseball***
* ***Special Right Triangles Baseball SOLUTIONS***
* ***Special Right Triangles Exit Ticket***
* ***Special Right Triangles Response Signals Practice***
* ***Special Right Triangles Response Signals Practice SOLUTIONS***
 |
| Lesson 4, Practicing Special Right Triangle Problems: To review the previous lesson’s concepts regarding special right triangles, use the ***Special Right Triangles Baseball*** warm-up. If student skills are weak, the game can be expanded using additional examples. Consult a geometry or pre-calculus teacher for additional problems that could be used for the initial pitch (example problem) in the game.Remind students that special right triangles are often embedded inside other problems such as area or perimeter problems. Also, remind students that it is not necessary to memorize the information since the information section before each mathematics section contains the equations and formulas. Direct students to p. 400 in the Kaplan text. It might be helpful for them to leave the book open to this page during the next activity. Two different games allow students to utilize their skill with solving special right triangles: ***Special Right Triangles Response Signals Practice*** (provided in both pdf and PPT format) or [Kahoot.it.](https://getkahoot.com/) For students with weak or mid-level skills, the ***Special Right Triangles Response Signals Practice*** allows more time for students to answer each question. Provide each student with an envelope containing 5 index cards. The index cards should be labeled A, B, C, D, and E. Project each problem from ***Special Right Triangles Response Signals Practice*** document or PowerPoint and direct students to raise the corresponding response card for his/her answer. This method aligns with the effective practice of using ***Non-Verbal Signals*** for assessing student mastery. Pair this strategy with the use of a ***Running Roster*** to pinpoint students that need additional tutoring or practice. For students with strong special right triangle solution skills, the same problems have been loaded into a Kahoot: Special Right Triangles SAT Practice. The questions are the same as on the ***Special Right Triangles Response Signals Practice***, but students only have 2 minutes to solve each problem. In addition, students who answer more quickly gain more points, thus, creating a more competitive atmosphere. To close the lesson, have students create their own baseball pitch problem on the ***Special Right Triangles Exit Ticket*** (they need to include a solution as well). Students may choose to make the problem difficult, simple, or alter the way in which runners advance around the bases. In subsequent lessons, use student-generated problems to continue review of this topic. |

| **Lessons 5, Multiple Figures** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Avoiding assumptions
* Breaking apart multiple figures
 | * *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 322-324*
* ***Multiple Figures Break A Parts***
* ***Multiple Figures Break A Parts SOLUTIONS***
* Naviance PrepMe Lesson: Manipulate Diagrams(Math-Geometry section)
* Naviance PrepMe Lesson: The Scale Lies(Math-Geometry section)
* Naviance PrepMe Lesson: Don’t Assume Anything(Math-General section)
* ***Never Assume***
* ***Non-Verbal Signals***
 |
| Lesson 5, Identifying Parts in Multiple Figures: Have students read pp. 322 - 324 in the Kaplan text as they enter the room. Attacking problems containing multiple geometric figures involves looking for commonalities in the figures or separating the figure into pieces. Often the process includes special right triangles. For instance, the example at the top of page 323 utilizes knowledge of isosceles right triangles (45-45-90 triangles). And again, after students introduce a line segment into the given figure for the example on pp. 323-324, a special right triangle emerges. This time we have an enlarged version of a 3-4-5 right triangle (Pythagorean triple) where the sides are 120-160-200. Students are often reluctant to add extraneous line segments to a given figure. To help them practice this skill, have them complete the ***Multiple-Figures Break-A-Parts*** practice by inserting or drawing additional lines into given figures. The Naviance PrepMe Lesson: Manipulate Diagrams (Math-Geometry section) also instructs students on the use of adding line segments to figures and extends the practice through two examples that require student calculations. Students often make assumptions about geometric figures that are not true. Using white-boards or another ***Non-Verbal Signals*** system, display the ***Never Assume*** PowerPoint. In this presentation, students are asked to determine if the statement is true or false based on the information given in the image. Remind students that important information is sometimes provided on the picture, but at other times it will be embedded within the question stem. Perhaps the most common student mistake is to assume lines are perpendicular (make 90 degree angles) when the markers or statements to support this assertion are not given. This translates into assuming triangles are right triangles when they are not. To reinforce this concept, instruct students to access the Naviance PrepMe Lesson: Don’t Assume Anything (Math-General section). Within the slides, another image differentiates between accurate and inaccurate conclusions that may be drawn. In closing, have students create two multiple figures that exemplify both of the traps associated with multiple figures. The first image should require the use of an additional segment to simplify the solution process. The second image should contain ambiguity about missing geometric markers to create conditions that may be correctly assumed or should not be assumed. Use these images for subsequent lessons and units to review students about this concept.Time permitting, an additional suggestion within the Naviance PrepMe Lesson: The Scale Lies (Math-Geometry section) instructs students to re-draw pictures “not drawn to scale”. |

| **Lesson 6, Probability and Geometric Probability** |
| --- |
| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Geometric probability
* Probability
 | * ***300 Pyramid Score Card***
* ***400 Pyramid Score Card***
* ***500 Pyramid Game Directions***
* ***500 Pyramid Score Card***
* *Kaplan SAT Strategies, Practice, and Review, 2015 pp. 354-355*
* ***Probability***
* ***Probability Practice Problems***
* ***Probability Practice Problems SOLUTIONS***
* ***Probability Quotes***
* ***Pyramid Game Board Photo***
* ***Pyramid Score Cards ANSWERS***
* SAT Online Course Lesson 18, Topic 5: Probability
* SAS Curriculum Pathways (works best in Internet Explorer)
	+ Audio Tutorial: Basic Probability (QL#1400)
* ***Sentencing by the Numbers***
 |
| Lesson 6, Probability and Geometric Probability: Probability is a concept that everyone encounters on a daily basis. No matter what field of study or occupation students choose to pursue, probability will be present in some form. However, understanding the mathematical complexities of this subject often eludes many people. Cut apart each quote from the ***Probability Quotes*** document and place them on a table so that students may read the quotes and choose the one they prefer best. Ask for student volunteers to share what they think their quote means and why they like it. The last course in which students learned about probability was seventh grade mathematics. To help remind students about the basic rules and laws of probability, have students complete the SAS Curriculum Pathway Audio Tutorial: Basic Probability (QL#1400). Upon completion of the 5 minute lesson, an online quiz is available for students to complete. Next, have students complete the SAT Online Course Lesson 18, Topic 5: Probability. While only 3 slides in length, the lesson introduces the idea of geometric probability. Geometric probability problems usually involve the calculation of area for two different regions and can range in difficulty levels from medium to high. To illustrate how the SAT assesses knowledge of probability, project the ***Probability*** PowerPoint to the whole class or allow students to move through the presentation on their own. The PowerPoint illustrates two easy-level questions that deal with standard probability questions and one difficult geometric probability question. While the geometric probability question is the same one found in the Kaplan text on pp. 354 – 355, the PowerPoint attempts to provide more detail about the solution steps. To practice solving probability problems, have students participate in the Pyramidgame using the ***Probability Practice Problems***. The ***500 Pyramid Game Directions*** provide explanations and rules for students with a strong mastery of the content (15 probability problems are provided). For students with mid-level or weak skills, the pace of the game can be accommodated by using fewer questions (300 Pyramid game and 400 Pyramid game). Score cards are provided for each level so that students may show work and record their answers for teacher assessment: ***300 Pyramid Score Card, 400 Pyramid Score Card,*** and ***500 Pyramid Score Card***. Answers are located on the ***Pyramid Score Cards ANSWERS*** and solutions are provided in the ***Probability Practice Problems SOLUTIONS.*** The game does not require the use of a game board, but if you would prefer, an image is available of the ***Pyramid Game Board Photo***.A closing activity might include a written response to the ***Sentencing by the Numbers*** article about a Virginia law that uses probability to guide sentencing for convicted criminals. After reading the article summary, ask students to explain how probability was used to set up the Virginia guidelines and whether they agree or disagree with the procedure. Alternative discussion questions are also provided. |

| **Lesson 7, Review of Introductory Geometric Skills** |
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| Recommended Pacing | Concepts/Skills Covered | Resources |
| 1 class | * Review of geometric skills
	+ Angles and Triangles
	+ Special right triangles
	+ Multiple figures
	+ Probability and geometric probability
* Review of test-taking skills
	+ Multiple-choice responses
 | * ***College\_Board\_Geometry\_Measurement\_Lesson***
* ***My Academic Goals***
* ***Weekly Check-In Template***
 |
| Lesson 7, Review of Introductory Geometric Skills: Use the ***College Board Geometry Measurement Lesson*** to have students reflect on the mathematical topics while using test-taking skills from this cycle. The lesson utilizes the mathematical content to focus student attention on erroneous distractors found within multiple-choice questions. To introduce the lesson, students are asked to review basic information about the mathematics sections: * How many multiple choice questions are in each section?
* How many choices does each section contain?
* How much is each correct answer worth?
* How much is each incorrect choice worth?
* Are the problems presented in order of difficulty?

Model solving the provided sample problem. Students are going to use the same process to create distracting answer choices for other problems. In partners, have each student re-work a given problem and then trade with their partner to create another set of distractors. The suggested problems to use are Problems 1, 2, 5, 6, and 8. At the end of the activity, each pair of students will have two problems that have been re-worked twice (once by each partner). In closing, have students take the provided lesson quiz.After the activity, share answers with the students and have them review their long-range, mid-range, and short-range goals (From Unit 1, Lesson 2) from the ***My Academic Goals*** worksheet. Using the ***Weekly Check-In Template***, have students create new weekly and monthly goals to reflect their mastery level of these skills and concepts***.*** Encourage students to create action steps that will assist them to reach these goals.  |