The Official Study Guide

Middle School Mathematics

Test Code: 5169

- Study Topics
- Practice Questions Directly from the Test Makers
- Test-Taking Strategies

www.ets.org/praxis
Study Guide for the Middle School Mathematics Test
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Study Guide for the *Middle School Mathematics* Test
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Chapter 1

Introduction to the *Middle School Mathematics* Test and Suggestions for Using This Study Guide
CHAPTER 1

Introduction to the Middle School Tests and Suggestions for Using This Study Guide

The Praxis Middle School tests assess beginning teachers’ understanding of the essential knowledge required for a beginning teacher at the middle school level. Four of the tests focus on a different content area: English Language Arts, Mathematics, Social Studies, and Science. A fifth test covers all four content areas.

In developing assessment material for these tests, ETS works in collaboration with teacher educators, higher education content specialists, and accomplished practicing teachers to keep the test updated and representative of current standards.

The Middle School Mathematics test (5169) consists of 55 selected-response and numeric-entry questions, and covers 5 major areas, in the following proportions.

<table>
<thead>
<tr>
<th>Content Category</th>
<th>Approximate Number of Questions</th>
<th>Approximate Percentage of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Arithmetic and Algebra</td>
<td>34</td>
<td>62%</td>
</tr>
<tr>
<td>A. Number and Operations</td>
<td>12</td>
<td>22%</td>
</tr>
<tr>
<td>B. Algebra</td>
<td>12</td>
<td>22%</td>
</tr>
<tr>
<td>C. Functions and Their Graphs</td>
<td>10</td>
<td>18%</td>
</tr>
<tr>
<td>II. Geometry and Data</td>
<td>21</td>
<td>38%</td>
</tr>
<tr>
<td>A. Geometry and Measurement;</td>
<td>11</td>
<td>20%</td>
</tr>
<tr>
<td>B. Probability, Statistics and Discrete Mathematics</td>
<td>10</td>
<td>18%</td>
</tr>
</tbody>
</table>

Test takers have 120 minutes to complete the test, which is given on computer. An on-screen graphing calculator is provided.
How to Use This Study Guide

This study guide gives you instruction, practice, and test-taking tips to help you prepare for the *Middle School Mathematics* test. In chapter 2 you will find a discussion of *The Praxis Series™*—what it is and how the tests in *The Praxis Series* are developed. In chapter 3 you will find information on how to answer selected-response and numeric-entry questions. Then chapters 4, 5, 6, and 7 will help you prepare for the test, give you the chance to take a practice test, and show you answers and sample responses and how they were scored.

So where should you start? Well, all users of this book will probably want to begin with the following two steps:

- **Become familiar with the test content.** Note what chapter 4 says about the topics covered in the test you plan to take.
- **Consider how well you know the content.** Perhaps you already know that you need to build up your skills in a particular area. If you’re not sure, skim over chapter 4 to see what topics the test covers. If you encounter material that feels unfamiliar or difficult, fold down page corners or insert sticky notes to remind yourself to spend extra time in these sections.

Also, all users of this book will probably want to end with these two steps:

- **Familiarize yourself with test taking.** Chapter 3 contains information to help you sharpen your skills in reading and answering selected-response and numeric-entry questions. Succeeding on selected-response and numeric-entry questions requires careful focus on the question, an eye for detail, and patient sifting of the answer choices.
  
  When you feel you understand the question formats, you can simulate the experience of the test by taking a practice test (chapter 5) within the specified time limits. Choose a time and place where you will not be interrupted or distracted. After you complete the test, look at chapter 6 to find the correct answers and explanations of those correct. Score your responses to the selected-response and numeric-entry questions. This knowledge will help you plan any additional studying you might need.

- **Register for the test and consider last-minute tips.** Consult [http://www.ets.org/praxis/register/](http://www.ets.org/praxis/register/) to learn how to register for the test, and review the checklist in chapter 7 to make sure you are ready for the test.

What you do between these first steps and these last steps depends on whether you intend to use this book to prepare on your own or as part of a class or study group.

**Using this book to prepare on your own**

If you are working by yourself to prepare for the *Middle School Mathematics* test, you may find it helpful to fill out the Study Plan Sheet in appendix A. This work sheet will help you to focus on what topics you need to study most, identify materials that will help you study, and set a schedule for doing the studying. The last item is particularly important if you know you tend to put off work.
CHAPTER 1

Using this book as part of a study group

People who have a lot of studying to do sometimes find it helpful to form a study group with others who are preparing toward the same goal. Study groups give members opportunities to ask questions and get detailed answers. In a group, some members usually have a better understanding of certain topics, while others in the group may be better at other topics. As members take turns explaining concepts to each other, everyone builds self-confidence. If the group encounters a question that none of the members can answer well, the members can go as a group to a teacher or other expert and get answers efficiently. Because study groups schedule regular meetings, group members study in a more disciplined fashion. They also gain emotional support. The group should be large enough so that various people can contribute various kinds of knowledge, but small enough so that it stays focused. Often, three to six people is a good size.

Here are some ways to use this book as part of a study group:

- **Plan the group’s study program.** Parts of the Study Plan Sheet in appendix A can help to structure your group’s study program. By filling out the first five columns and sharing the work sheets, everyone will learn more about your group’s mix of abilities and about the resources (such as textbooks) that members can share with the group. In the sixth column (“Dates planned for study of content”), you can create an overall schedule for your group’s study program.

- **Plan individual group sessions.** At the end of each session, the group should decide what specific topics will be covered at the next meeting and who will present each topic. Use the topics in the chapter that covers the test you will take.

- **Prepare your presentation for the group.** When it’s your turn to be presenter, prepare something that’s more than a lecture. Write two or three original questions to pose to the group. Practicing writing actual questions can help you better understand the topics covered on the test as well as the types of questions you will encounter on the test. It will also give other members of the group extra practice at answering questions.

- **Take the practice test together.** The idea of the practice test is to simulate an actual administration of the test, so scheduling a test session with the group will add to the realism and will also help boost everyone’s confidence.

- **Learn from the results of the practice test.** For each test, score each other’s answers. In reviewing your colleague’s answers, indicate which answers are wrong, but also be supportive. Point out what your study partner got right and that therefore earned points.

Then plan one or more study sessions based on aspects of the questions on which group members performed poorly. For example, each group member might be responsible for rewriting one paragraph of a response in which someone else did an inadequate job of answering the question.
Whether you decide to study alone or with a group, remember that the best way to prepare is to have an organized plan. The plan should set goals based on specific topics and skills that you need to learn, and it should commit you to a realistic set of deadlines for meeting these goals. Then you need to discipline yourself to stick with your plan and accomplish your goals on schedule.
Chapter 2
Background Information on The Praxis Series™ Subject Assessments
CHAPTER 2

What Are The Praxis Series Assessments?

The Praxis Series assessments are designed by ETS to assess your knowledge of the subject area you plan to teach, and they are a part of the licensing procedure in many states. This study guide covers assessments that test your knowledge of the actual content you hope to be licensed to teach. Your state has adopted The Praxis Series tests because it wants to be certain that you have achieved a specified level of mastery of your subject area before it grants you a license to teach in a classroom.

The Praxis Series tests are part of a national testing program, meaning that the tests covered in this study guide are used in more than one state. The advantage of taking Praxis tests is that if you want to move to another state that uses The Praxis Series tests for licensure, you can transfer your scores to that state. Passing scores are set by states, however, so if you are planning to apply for licensure in another state, you may find that the passing scores there are different. You can find passing scores for all states that use The Praxis Series tests online at www.ets.org/praxis/prxstate.html or in the Understanding Your Praxis Scores pamphlet, available at your college’s School of Education or by calling ETS at 609-771-7395 or 800-772-9476.

What Is Licensure?

Licensure in any area—medicine, law, architecture, accounting, cosmetology—is an assurance to the public that the person holding the license has demonstrated a certain level of competence. The main premise of licensure is that the person holding the license will do no harm. In the case of teacher licensing, a license tells the public that the person holding the license can be trusted to educate children competently and professionally.

Because a license makes such a serious claim about its holder, licensure tests are usually quite demanding. In some fields licensure tests have more than one part and last for more than one day. Candidates for licensure in all fields plan intensive study as part of their professional preparation: some join study groups, others study alone. But preparing to take a licensure test is, in all cases, a professional activity. Because it assesses your entire body of knowledge or skill for the field you want to enter, preparing for a licensure exam takes planning, discipline, and sustained effort. Studying thoroughly is highly recommended.

Why Does My State Require The Praxis Series Assessments?

Your state chose The Praxis Series assessments because the tests assess the breadth and depth of content—called the “domain”—that your state wants its teachers to possess before they begin to teach. The level of content knowledge, reflected in the passing score, is based on recommendations of panels of teachers and teacher educators in each subject area. The state licensing agency and, in some states, the state legislature ratify the passing scores that have been recommended by panels of teachers. You can find out the passing score required for The Praxis Series assessments in your state online or by looking in the pamphlet Understanding Your Praxis Scores, which is free from ETS (see above). If you look through this pamphlet, you will see that not all states use the same test modules, and even when they do, the passing scores can differ from state to state.
CHAPTER 2

What Kinds of Tests Are The Praxis Series Assessments?

The Praxis Series assessments include a variety of question types: constructed response, for which you write a response of your own; selected response, for which you select one or more answers from a list of choices or make another kind of selection (e.g., by clicking on a sentence in a text or by clicking on part of a graphic); and numeric entry, for which you enter a numeric value in an answer field. Tests composed of selected-response and numeric-entry questions can survey a wider domain because they can ask more questions in a limited period of time. Far fewer constructed-response questions can be asked in the same period of time, but the questions require you to demonstrate the depth of your knowledge in the area covered. Some tests include selected-response questions (or selected response and numeric-entry questions) as well as constructed response questions, allowing them to test both the breadth and depth of your knowledge.

What Do the Tests Measure?

The Praxis Series assessments measure content knowledge and general and subject-specific pedagogy. They measure your understanding of the subject area you want to teach. Selected-response and numeric-entry questions measure a broad range of knowledge across your content area. Constructed-response questions measure your ability to explain in depth a few essential topics in your subject area. However, the tests do not measure your actual teaching ability. They measure your knowledge of your subject and of how to teach it. The teachers in your field who help us design and write these tests, and the states that require these tests, do so in the belief that knowledge of subject area is a fundamental requirement for licensure. Your teaching ability is a skill that is measured in other ways: observation, videotaped teaching, or portfolios are typically used by states to measure teaching ability. Teaching combines many complex skills, only some of which can be measured by a test. The Praxis Series assessments are designed to measure how thoroughly you understand the material in the subject area(s) in which you want to be licensed to teach.

How Were These Tests Developed?

ETS began the development of The Praxis Series assessments with a careful review of national and professional standards relevant to the test content. Assessment specialists and job analysis experts perform this review and begin to draft the content domains for the test and, for each area and subarea, identify the critical knowledge and skills a beginning teacher needs to facilitate student learning. ETS then convenes National Advisory Committees (NACs) consisting of teachers and teacher educators in the field to be assessed. The job of the NAC is to revise the draft content domains and to draft the knowledge and skill statements that will form the basis of a job analysis survey. Job analysis — the systematic collection of judgments regarding the linkage between the test content and occupationally important knowledge and skills — is the primary means for establishing validity evidence for certification tests. The job analysis survey samples the field broadly, canvassing teachers, teacher leaders, and teacher educators in colleges and universities. Respondents evaluate how important each knowledge and skill statement is for entry into the profession, and they also rate the relative importance of each category of statements to help determine the weighting of each category. Once the results of the survey are analyzed, the NAC reconvenes to develop the test blueprint and test specifications. The NAC also uses the findings of the job survey to determine the relative weighting of the content areas that the test will cover. From the test specifications, committees of teachers and professional test developers create test questions and test forms.
CHAPTER 2

When your state adopted *The Praxis Series* assessments it uses, panels of practicing teachers and teacher educators in each subject area met to examine the tests question by question to evaluate each question for its relevance to beginning teachers in your state and to recommend a passing score. This is called a “standard setting study.” A test is considered valid for a job if it measures what people must know and be able to do on that job. For the test to be adopted in your state, teachers in your state must judge that it is valid.