

Nes math practice test Full Version

NES Math Practice Test: Your Ultimate Guide to Success

Preparing for the NES (National Evaluation Series) Math Practice Test is a crucial step for aspiring educators seeking certification or licensure. Whether you're a prospective teacher aiming to demonstrate your math proficiency or a seasoned educator brushing up on key concepts, understanding what to expect from the NES Math Practice Test can significantly enhance your study strategy. This comprehensive guide will explore the structure of the test, provide effective study tips, highlight key topics, and share practice resources to help you excel on exam day.

Understanding the NES Math Practice Test

Before diving into specific study techniques, it's essential to understand the format and content of the NES Math Practice Test. This awareness allows you to tailor your preparation effectively.

Test Format and Structure

The NES Math Practice Test typically assesses a candidate's knowledge of fundamental mathematical concepts and their ability to apply these concepts in various scenarios. The format includes:

- **Multiple-choice questions:** Most questions are multiple-choice, requiring you to select the best answer from four options.
- **Number of questions:** The test usually comprises around 55-60 questions.
- **Time limit:** Candidates are allotted approximately 75 minutes to complete the exam.
- **Coverage:** The test covers a broad range of topics, from basic arithmetic to algebra and geometry.

Scoring and Passing Criteria

Scoring on the NES varies by state, but generally, a scaled score of around 220-240 is considered passing. It's important to check your specific state's requirements. The test results not only indicate your proficiency but also help licensing agencies determine your readiness to teach.

Key Topics Covered in the NES Math Practice Test

To prepare effectively, you need to focus on the core areas of mathematics that are tested. Here are

the main topics along with subtopics to guide your study plan.

Number and Operations

This foundational area covers:

- Understanding integers, decimals, and fractions
- Performing operations with whole numbers, fractions, and decimals
- Order of operations
- Factors, multiples, and prime numbers
- Ratios, proportions, and percentages

Algebra

Algebraic concepts include:

- Solving linear equations and inequalities
- Understanding algebraic expressions and formulas
- Graphing linear functions
- Working with algebraic properties and patterns

Geometry

Geometry questions test your understanding of:

- Basic geometric shapes and properties
- Angles, lines, and their relationships
- Perimeter, area, and volume calculations
- Coordinate plane concepts
- Transformations and symmetry

Data Analysis and Probability

This section assesses your ability to interpret data, such as:

- Reading graphs and charts
- Calculating measures of central tendency (mean, median, mode)

- Understanding probability concepts
- Applying statistical reasoning

Effective Strategies for NES Math Practice Test Preparation

Success on the NES Math Practice Test requires a well-structured study plan. Here are proven strategies to maximize your preparation efforts.

Develop a Study Schedule

Creating a consistent study routine helps reinforce learning and builds confidence. Consider:

- Setting specific goals for each week
- Allocating time for reviewing different topics
- Including regular practice tests to monitor progress

Use Quality Practice Tests

Practice tests simulate the real exam environment, helping you become familiar with question types and timing. Tips include:

- Using official NES practice materials if available
- Analyzing your results to identify weak areas
- Repeating practice tests to track improvement

Review Fundamental Concepts

Solid understanding of core principles is vital. Focus on:

- Revisiting basic arithmetic operations
- Understanding algebraic formulas and properties
- Practicing geometric calculations and reasoning

Learn Test-Taking Strategies

Enhance your efficiency and accuracy by applying techniques such as:

- Eliminating obviously incorrect options
- Managing your time effectively? spend roughly 1-2 minutes per question
- Answering easier questions first to secure points early
- Reviewing flagged questions if time permits

Resources for NES Math Practice Test Preparation

Access to quality resources can make a significant difference in your study journey. Here are some recommended options:

Official Practice Tests and Study Guides

Many testing organizations provide official practice materials, which are the most accurate reflection of the exam content.

Online Practice Test Platforms

Websites like Khan Academy, Mometrix, and Teachers Test Prep offer practice questions, tutorials, and full-length practice exams.

Math Textbooks and Workbooks

Standard math textbooks aligned with K-12 curricula can help reinforce fundamental skills. Workbooks designed for teacher certification exams are also valuable.

Study Groups and Tutoring

Collaborative learning through study groups or tutoring can clarify complex concepts and boost confidence.

Additional Tips for Success

To further enhance your readiness, consider these final tips:

- **Stay consistent:** Regular study is more effective than cramming.
- **Focus on understanding:** Aim to grasp concepts rather than memorize answers.
- **Practice under timed conditions:** Improve your pacing to complete the test comfortably.
- **Take care of yourself:** Ensure adequate rest, nutrition, and stress management leading up to the test day.

Conclusion

Preparing for the **NES Math Practice Test** is a manageable process when approached with a strategic plan, quality resources, and consistent effort. Focus on mastering key mathematical concepts, practicing regularly, and developing effective test-taking strategies. Remember, thorough preparation not only boosts your confidence but also increases your chances of passing the exam and advancing your teaching career. Utilize the resources available, stay motivated, and approach the test with a positive mindset. Success is within your reach!

NES Math Practice Test: Your Ultimate Guide to Preparing and Excelling

If you're preparing for the NES Math Practice Test, you're taking a crucial step toward achieving your educational or professional goals. The NES (Niedersächsischer Einstellungstest or similar standardized assessments depending on context) often requires a solid understanding of mathematical concepts, problem-solving skills, and quick thinking. A comprehensive practice test not only helps you familiarize yourself with the question formats but also boosts your confidence and highlights areas that need improvement. In this guide, we'll walk you through everything you need to know about NES math practice tests—from understanding the test structure to effective study strategies, sample questions, and tips for success.

Understanding the NES Math Practice Test

Before diving into practice questions, it's essential to understand what the NES Math Practice Test typically entails. While specific content may vary depending on the version or purpose of the test, most assessments share common features.

Test Format and Content

- **Multiple-Choice Questions:** The majority of questions are multiple-choice, requiring you to select the correct answer from four options.
- **Time Limit:** The test usually has a strict time limit, demanding quick calculations and decision-making.
- **Coverage Areas:** The test often encompasses fundamental mathematical domains, including:
 - Arithmetic operations (addition, subtraction, multiplication, division)
 - Fractions, decimals, and percentages
 - Ratios and proportions
 - Basic algebra and equations
 - Geometry (shapes, areas, perimeters)
 - Word problems and real-world applications

Scoring and Results

Your score on the NES math practice test will typically be based on the number of correct answers, with no penalty for guessing. It's important to aim for accuracy and speed to maximize your performance.

Why Practice Matters: Benefits of Taking NES Math Practice Tests

Practicing with sample tests offers several advantages:

- Familiarization with Question Types: You learn to recognize patterns and question formats.
- Time Management Skills: Practice helps you develop strategies to allocate time efficiently.
- Identify Weak Areas: Spot topics that require more review.
- Build Confidence: Repeated practice reduces anxiety and improves test-taking skills.
- Simulate Test Conditions: Replicating the test environment helps you adapt to real exam pressures.

Developing an Effective Study Strategy

To make the most of your NES math practice tests, consider implementing a structured study plan.

Step 1: Assess Your Starting Point

- Take an initial practice test under timed conditions.
- Identify your strengths and weaknesses.
- Focus your study sessions accordingly.

Step 2: Review Core Concepts

- Revisit fundamental math topics.
- Use textbooks, online tutorials, or educational apps.
- Practice problem types that challenge you most.

Step 3: Practice Regularly

- Schedule consistent practice sessions.
- Use official or reputable practice tests.

- Time yourself to simulate exam conditions.

Step 4: Analyze Your Performance

- Review incorrect answers to understand mistakes.
- Track progress over time.
- Adjust your study plan based on performance data.

Sample Questions for NES Math Practice Test

Below are sample questions across different topics to give you a sense of what to expect.

- Basic Arithmetic

Question: What is $348 + 529$?

- a) 867
- b) 887
- c) 857
- d) 857

Answer: a) 867

- Fractions and Decimals

Question: Convert $\frac{3}{4}$ to a decimal.

- a) 0.25
- b) 0.75
- c) 1.25
- d) 1.75

Answer: b) 0.75

- Percentages

Question: A shirt originally costs \$40. It's on sale for 25% off. What is the sale price?

a) \$10

b) \$20

c) \$30

d) \$35

Answer: c) \$30

- Ratios and Proportions

Question: If 3 apples cost \$1.50, how much do 5 apples cost?

a) \$2.50

b) \$2.75

c) \$3.00

d) \$3.25

Answer: c) \$2.50

Note: Correct answer is \$2.50 (since $\$1.50 / 3 = \0.50 per apple, so 5 apples = $5 \times \$0.50 = \2.50).

- Basic Algebra

Question: Solve for x: $2x + 5 = 13$

a) 4

b) 6

c) 8

d) 9

Answer: a) 4

- Geometry

Question: What is the area of a rectangle with length 8 cm and width 3 cm?

a) 24 cm²

b) 11 cm²

c) 24 cm

d) 11 cm

Answer: a) 24 cm²

Tips for Excelling on the NES Math Practice Test

- Practice Mental Math: Speed and accuracy in mental calculations save time.
- Use Process of Elimination: Narrow down choices to improve your chances.
- Skip Difficult Questions Temporarily: Return to hard questions after completing easier ones.
- Read Questions Carefully: Misreading can lead to avoidable mistakes.
- Check Your Work: If time permits, review answers before submitting.

Resources for NES Math Practice

To supplement your preparation, consider utilizing:

- Official Practice Tests: If available, these are the most accurate representations.
- Online Math Practice Platforms: Websites like Khan Academy, IXL, or Mathway.
- Educational Apps: Math practice apps designed for quick drills.
- Study Guides and Workbooks: Focused on the specific topics tested.

Final Thoughts: Preparing for Success

Success on the NES Math Practice Test hinges on consistent preparation, understanding the test format, and practicing under timed conditions. Remember, the goal is not just to memorize formulas but to develop a deep understanding of mathematical principles and improve problem-solving agility. Regular practice, review of mistakes, and strategic study will position you for a high score and confidence on exam day.

Good luck, and stay committed?you're capable of achieving great results!

Question Answer What topics are typically covered in an NES math practice test? An NES math practice test generally covers topics such as algebra, geometry, number operations, fractions, decimals, ratios, proportions, and basic arithmetic skills to assess teachers' content knowledge. How can I effectively prepare for the NES math practice test? Effective preparation includes reviewing NES math content areas, practicing with sample questions and full-length practice tests, identifying weak areas, and studying relevant math concepts through textbooks and online resources. Are there free resources available for NES math practice tests? Yes, many websites offer free NES math practice questions, sample tests, and study guides to help candidates prepare without cost. Examples include the official NES website, teacher prep forums, and educational resource platforms. How is the NES math practice test scored, and what is considered a passing score? The NES math test is scored based on the number of correct answers, with the passing score varying by state or certification requirements. Typically, a score of around 70-75% is needed to pass, but candidates should check specific state guidelines. What are some common challenging question types in the NES math practice test? Common challenging questions include multi-step word problems, questions involving ratios and proportions, and those requiring application of algebraic concepts or geometric reasoning. Can practicing with NES math sample questions improve my test performance? Yes, practicing with sample questions helps familiarize you with the test format, improves time management skills, and identifies areas needing further review, thereby boosting overall performance. How long should I dedicate to NES math practice each week? It is recommended to dedicate at least 3-5 hours per week to focused NES math practice, gradually increasing as the test date approaches to ensure comprehensive review and confidence building.

Related keywords: NES math, practice test, math assessment, NES exam prep, math skills, teaching certification, educator test, math practice questions, test preparation, educational assessment

MICROSOFT TEST MANAGER TUTORIAL

Microsoft Test Manager Tutorial: A Comprehensive Guide to Efficient Test Management

In the world of software development, ensuring the quality and reliability of your applications is paramount. Microsoft Test Manager (MTM) is a powerful tool designed to streamline the testing process, enabling teams to plan, execute, and track testing efforts with ease. Whether you're a beginner or looking to enhance your testing workflows, this **Microsoft Test Manager tutorial** will provide you with a step-by-step guide to harnessing MTM's full potential for your projects.

Understanding Microsoft Test Manager

Before diving into the tutorial, it's essential to grasp what Microsoft Test Manager is and how it integrates into the broader Visual Studio ecosystem.

What is Microsoft Test Manager?

Microsoft Test Manager is a test management tool integrated with Visual Studio Team Services (VSTS) and Azure DevOps. It provides an intuitive interface for managing test plans, creating and executing test cases, and tracking testing progress. MTM supports both manual and exploratory testing, making it versatile for various testing scenarios.

Key Features of Microsoft Test Manager

- Test Planning: Create and organize test plans, test suites, and test cases.
- Test Execution: Execute manual tests and record results efficiently.
- Test Tracking: Monitor testing progress and generate detailed reports.
- Exploratory Testing: Conduct ad-hoc testing sessions with session-based testing capabilities.
- Integration: Seamlessly connects with Azure DevOps for continuous testing workflows.

Setting Up Microsoft Test Manager

Getting started with MTM involves installing and configuring the tool for your environment.

Prerequisites

- Visual Studio Enterprise or Professional edition (with test management features).
- Azure DevOps account or TFS (Team Foundation Server) setup.
- Appropriate permissions to access test management features.

Installing Microsoft Test Manager

- Download the Visual Studio Installer from the official Microsoft website.
- Choose the edition that includes testing tools (e.g., Visual Studio Enterprise).
- During installation, select the "Testing Tools" workload to install MTM.
- Complete the installation and launch Visual Studio.
- Connect to your Azure DevOps project or TFS server within Visual Studio.

Creating and Managing Test Plans

A well-structured test plan is the foundation of successful testing. MTM simplifies organizing your testing efforts through test plans and suites.

Creating a Test Plan

- Open Microsoft Test Manager from Visual Studio or the Azure DevOps portal.
- Navigate to the "Test Plans" section.
- Click "New Test Plan" and provide a descriptive name, description, and start/end dates.
- Associate the test plan with a specific build or release if needed.
- Save the test plan to begin adding test cases.

Organizing Test Suites

Test suites help categorize test cases based on features, modules, or testing strategies.

- **Static Test Suites:** Manually organize test cases into logical groups.
- **Requirement-Based Test Suites:** Link test cases to specific requirements or user stories.
- **Query-Based Test Suites:** Dynamically generate test cases based on queries.

Adding Test Cases

- Within your test suite, click "New Test Case" or import existing cases.
- Define the test case steps, expected results, and associated requirements.
- Assign priority, owner, and other metadata to facilitate management.
- Save the test case to include it in your suite.

Executing Tests with Microsoft Test Manager

Once your test cases are organized, the next step is executing tests and recording results.

Manual Test Execution

- Open the test plan and select the test suite to execute.
- Click "Run" on the test case you wish to execute.
- Follow the test steps as documented, marking each step as "Passed" or "Failed."
- If a test fails, record detailed bug information directly from the test runner.
- Complete the test run, and the results will be saved automatically.

Using Action Recording and Data Collection

MTM allows capturing detailed logs and screenshots during test execution, aiding in defect analysis and reproducibility.

Exploratory Testing

For ad-hoc testing, MTM offers session-based testing:

- Schedule a testing session with session details.
- Conduct testing while documenting observations and findings.
- Record bugs and issues discovered during the session.

Tracking and Reporting Testing Progress

Effective test management requires insight into testing status and quality metrics.

Monitoring Test Results

- Navigate to the "Test Results" section in MTM or Azure DevOps.
- Review individual test case outcomes and overall progress.
- Filter results by tester, status, or test plan for detailed analysis.

Generating Reports

MTM provides various built-in reports to visualize testing status:

- Test Results Summary
- Test Case Progress and Trends

- Bugs and Defects Reports

Integrating with Bug Tracking

During testing, bugs can be logged directly from MTM, linked to specific failed test cases, ensuring traceability and quick resolution.

Advanced Tips and Best Practices

Maximize your testing efficiency with these expert tips:

Automate Repetitive Tests

Integrate MTM with automated testing frameworks like MSTest, NUnit, or Selenium to run automated tests alongside manual efforts.

Maintain Test Cases Regularly

Keep your test cases updated with application changes to ensure relevance and accuracy.

Use Tags and Filters

Leverage tags and filters to quickly locate and execute specific test cases based on criteria like priority, feature, or owner.

Collaborate Effectively

Encourage team collaboration by sharing test plans and results, and conducting regular review meetings to discuss testing progress.

Conclusion

Microsoft Test Manager is an essential tool for teams aiming to implement structured and efficient testing workflows. From creating comprehensive test plans and organizing test suites to executing tests and tracking outcomes, MTM provides a centralized platform that enhances test visibility and quality assurance. By following this **Microsoft Test Manager tutorial**, you can streamline your testing process, improve defect detection, and deliver higher-quality software products. Remember to stay updated with the latest features and best practices to maximize your testing success with MTM.

Microsoft Test Manager tutorial: A Comprehensive Guide to Streamlining Your Testing Process

Microsoft Test Manager (MTM) is a powerful tool integrated within the Azure DevOps suite, designed to facilitate efficient test planning, management, and execution. Whether you are a QA professional, a developer, or a project manager, mastering MTM can significantly enhance your testing workflows, improve defect detection rates, and ensure higher quality software releases. This tutorial aims to provide an in-depth overview of Microsoft Test Manager, guiding you through its features, setup, best practices, and real-world applications.

Introduction to Microsoft Test Manager

Microsoft Test Manager is a dedicated testing management environment that helps teams plan, execute, and track testing activities seamlessly. Originally part of Visual Studio Test Professional, MTM is now integrated within Azure DevOps, offering a unified platform for Agile testing, exploratory testing, and manual test case management.

Key Features of Microsoft Test Manager

- Test Planning: Create and organize test plans, test suites, and test cases.
- Test Execution: Run manual tests, record results, and capture screenshots.
- Test Management: Track defects, manage test configurations, and generate reports.
- Integration: Seamlessly connect with Azure DevOps for continuous integration and automated testing workflows.
- Exploratory Testing: Record exploratory sessions with detailed notes and recordings.

Setting Up Microsoft Test Manager

Before diving into testing, proper setup of MTM is essential.

Prerequisites

- A valid Azure DevOps account with appropriate permissions.
- Installed Visual Studio Test Professional or access via Azure DevOps.
- Access to a test environment or lab machines.

Installation and Configuration

- Download and Install: Download Microsoft Test Manager from the Visual Studio downloads page or via Azure DevOps.
- Connect to Azure DevOps: Launch MTM and connect it to your Azure DevOps project by

signing in with your credentials.

- Configure Test Environments: Set up test machines, configurations, and network environments to align with your testing needs.

Tips for Effective Setup

- Organize your test plans hierarchically for easier management.
- Maintain a clear mapping between test environments and real-world configurations.
- Regularly update test artifacts to ensure they reflect current application versions.

Creating and Managing Test Plans

Test planning is the foundation of effective testing.

Creating a Test Plan

- In MTM, navigate to the "Test Plans" section.
- Click "New Test Plan" and provide a descriptive name, start/end dates, and any relevant details.
- Assign ownership and stakeholders.

Organizing Test Suites

- Static Test Suites: Manually added test cases grouped logically.
- Requirement-based Suites: Linked to user stories or requirements for traceability.
- Query-based Suites: Dynamic grouping based on queries.

Best Practices

- Break down large test plans into smaller, manageable suites.
- Link test cases to user stories or bugs for better traceability.
- Regularly review and update test plans to reflect current project scope.

Designing and Managing Test Cases

Creating effective test cases is critical to uncovering defects early.

Writing Test Cases

- Clear, concise steps with expected results.
- Use descriptive titles and tags for easy filtering.
- Include preconditions and postconditions.

Reusing Test Cases

- Modularize test steps for reuse across different test cases.
- Attach relevant documentation, screenshots, or scripts.

Organizing Test Cases

- Group related test cases into shared test suites.
- Use labels and tags for categorization.

Tips for Effective Test Cases

- Prioritize test cases based on risk and impact.
- Keep test cases up-to-date with application changes.
- Incorporate exploratory testing notes within test cases or as separate sessions.

Test Execution and Result Recording

Executing tests efficiently and accurately recording results is vital.

Running Manual Tests

- Select a test case from your test suite.
- Follow each step, observing the actual behavior.
- Record outcomes: Passed, Failed, Blocked, or Not Applicable.
- Capture screenshots or record videos if needed.

Recording Defects

- Link defects directly to failed test cases.
- Provide detailed descriptions, steps to reproduce, and severity.
- Attach logs or screenshots to aid debugging.

Managing Test Runs

- Use test configurations to run multiple test cases under different environments.
- Schedule and assign test runs to team members.
- Monitor real-time progress and results.

Pros and Cons of Test Execution Features

Pros:

- Streamlined process for manual testing.
- Rich media capture for detailed documentation.
- Easy defect linkage and traceability.

Cons:

- Manual process can be time-consuming for large test suites.
- Limited automation capabilities within MTM itself.

Integrating Automated Testing with Microsoft Test Manager

While MTM excels at manual testing, integration with automated testing frameworks enhances overall efficiency.

Integration with Visual Studio Test Automation

- Use Visual Studio Test tools to develop automated test scripts.
- Link automated tests to test cases in MTM.
- Run automated tests as part of continuous integration pipelines.

Benefits of Integration

- Reduces manual effort.
- Ensures consistency between manual and automated testing.
- Facilitates comprehensive test coverage.

Limitations

- Setup can be complex for beginners.
- Requires scripting knowledge for automation.

Reporting and Tracking

Effective reporting provides insights into testing progress and quality metrics.

Built-in Reports

- Test Run Summary
- Test Results Trend
- Defect Status and Age
- Requirements Traceability Matrix

Custom Reports

- Use Azure DevOps Analytics or Power BI for tailored dashboards.
- Export data for external analysis.

Best Practices

- Regularly review reports to identify bottlenecks.
- Use metrics to prioritize testing efforts.
- Maintain up-to-date dashboards for stakeholder visibility.

Best Practices for Using Microsoft Test Manager

- Plan Early: Incorporate testing early in the development lifecycle.
- Maintain Test Artifacts: Keep test cases and plans updated with application changes.
- Leverage Linkages: Connect requirements, test cases, defects, and build versions.
- Automate Where Possible: Use automation to handle repetitive and regression testing.
- Collaborate: Engage team members through shared test plans and results.
- Review Regularly: Conduct test reviews and retrospectives for continuous improvement.

Common Challenges and How to Overcome Them

Challenge: Managing Large Test Suites

Solution: Break down into smaller, manageable suites; use query-based suites for dynamic grouping.

Challenge: Keeping Test Cases Up-to-date

Solution: Establish a review cycle aligned with development sprints; assign ownership.

Challenge: Integration Complexity

Solution: Invest in automation and continuous integration pipelines; use documentation and training.

Challenge: Limited Automation within MTM

Solution: Use external automation tools integrated with Azure DevOps, such as Selenium or Coded UI.

Conclusion

Microsoft Test Manager is a robust tool that, when used effectively, can significantly boost your testing efficiency, coverage, and traceability. Its comprehensive features for test planning, execution, defect management, and reporting make it indispensable for teams adopting Agile and DevOps practices. While there are challenges, especially around automation and managing large test repositories, with proper setup, training, and best practices, MTM can become a cornerstone of your software quality assurance process.

By following this tutorial, you should now have a clear understanding of how to leverage Microsoft Test Manager to streamline your testing operations, improve collaboration, and ultimately deliver higher quality software to your users. Remember, continuous learning and adaptation are key to maximizing the benefits of MTM in your projects.

Question What are the main features of Microsoft Test Manager (MTM)? Microsoft Test Manager (MTM) provides features such as test planning, manual test execution, test case management, bug tracking integration, and collaboration tools to streamline the testing process within Visual Studio and Azure DevOps. How do I create and organize test plans in Microsoft Test Manager? In MTM, you can create test plans by navigating to the 'Test Plans' hub, clicking 'New Test Plan,' and defining its name and details. You can then add test suites and test cases to organize tests based on requirements, features, or test types for better management. Can I

automate tests using Microsoft Test Manager, and how is it integrated with other tools? While MTM primarily supports manual testing, it integrates seamlessly with Visual Studio and Azure DevOps, enabling automation through test scripts and frameworks like MSTest, Selenium, or CodedUI. Automated tests can be linked to test cases for comprehensive test management. What are the best practices for using Microsoft Test Manager effectively? Best practices include maintaining detailed and reusable test cases, organizing tests into logical suites, utilizing shared steps for common actions, integrating with bug tracking, and regularly updating test plans based on project changes to ensure thorough testing coverage. Is Microsoft Test Manager suitable for Agile development environments? Yes, MTM is well-suited for Agile teams as it supports iterative testing, easy integration with Azure DevOps Agile tools, and flexible test planning, allowing teams to adapt testing activities to sprint cycles and continuous delivery workflows.

Related keywords: Microsoft Test Manager, TFS testing, test planning, test case management, automated testing, test execution, bug tracking, test lab management, test reporting, test automation tools

Read the full article online: [microsoft test manager tutorial](#)