



Adolescence and Young Adulthood

MATHEMATICS

Scoring Guide for Candidates

For retake candidates who began the Certification process in 2013-14 and earlier.

- **Part 1** provides you with the tools to understand and interpret your scores.
- **Part 2** provides the scoring rubrics for your certificate area, guiding you as you develop your portfolio entries and prepare for your assessment center exercises.

*National Board Certification
Promotes Better Teaching,
Better Learning, Better Schools*

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About This Scoring Guide

The *Scoring Guide for Candidates* is a comprehensive overview of the National Board's scoring process. It is essential reading for anyone pursuing National Board Certification®. Together the two parts of the *Scoring Guide for Candidates* will help you on your path toward becoming a National Board Certified Teacher® (NBCT®).

Part 1: Understanding and Interpreting Your Scores

Part 1 guides you through the scoring process, providing you with the tools to understand and interpret your scores. Applicable to all certificate areas, **Part 1** includes crucial information about the role of the National Board Standards, which represent a professional consensus on the critical aspects of practice that distinguish accomplished teachers in the field and function as the foundation of each assessment.

Additionally, you will find information in **Part 1** about NBPTS® assessors—the qualified professionals who assign your scores. You will also find the score ranges, which will allow you to match your score to the appropriate level of performance. **Part 1** also discusses the National Board's retake policies, relevant to you if you do not meet the performance standard on your initial certification attempt. In **Part 1** you will learn how to interpret your individual scores and, if necessary, develop strategies to improve them.

Part 2: Understanding and Applying the Scoring Criteria

Part 2 provides the scoring rubrics for each portfolio entry and assessment center exercise in your certificate area, guiding you as you develop your portfolio entries and prepare for your assessment center exercises. The rubrics are presented here in a bulleted format to highlight the vital information contained in each. Reading the scoring rubrics will help you think about ways to strengthen your practice and best demonstrate your teaching expertise. The rubrics are the tool that assessors use to determine the appropriate scores for performance in your field.

The NBPTS Web site provides additional documents to assist you in the process of developing your portfolio entries and evaluating your performance. One such document is the [Evaluation of Evidence Guide](#). Each certificate-specific guide corresponds to an individual portfolio entry for your certificate area, and each includes questions that shape how assessors view the evidence you submit.

Other resources that will help you prepare for your assessment include the following certificate-specific documents, all of which are available online at www.boardcertifiedteachers.org:

- *Assessment at a Glance*
- Standards for Accomplished Teaching
- *Portfolio Instructions*



Part 1:

Understanding and Interpreting Your Scores

This resource is available as a PDF file. You may select the link below to view or print **Part 1**.

[Scoring Guide for Candidates, Part 1: Understanding and Interpreting Your Scores](#)



Part 2:

Understanding and Applying the Scoring Criteria

Part 2: Understanding and Applying the Scoring Criteria presents the scoring rubrics for your certificate area. You should read the rubrics while developing your portfolio entries and preparing for your assessment center exercises. These rubrics, which are derived from the Standards, define the levels of accomplished teaching that you must demonstrate. This reference information will help you understand how the rubrics guide assessors in evaluating your work.

Each rubric begins with an overarching statement that summarizes the quality of performance at each of the rubric levels. For example, the overarching statement for a Level 4 rubric might read: "The Level 4 performance provides *clear, consistent, and convincing* evidence of the teacher's knowledge and practice in his or her field." This precise language is used to distinguish between the four levels of the score scale. The body of the rubric consists of statements organized in a manner that reflects the order of tasks or questions within the entry or exercise. If you are asked to discuss your goals in the first response, for example, then the quality statement about goals will be stated at the beginning of the body of the rubric.

One way to understand the meaning of the entire rubric and how it relates to the quality of a performance is to read across the rubric. You can do this by reading the first sentence for Level 4, the first sentence for Level 3, and so on. This reveals the gradations of quality delineated for each feature of the response. A careful reading of the rubrics is an invaluable step in helping you successfully develop your portfolio entries and prepare for your assessment center exercises.

Your portfolio entries and assessment center exercises are scored holistically. To score holistically, an assessor must look at the entry and exercise for its overall quality and evaluate the work as a whole. The response may have characteristics of adjacent performance levels, but the assessor must assign the score that best describes the work as a whole. When scoring, an assessor reads completely, and views, when applicable, the entire entry and exercise before assigning a score. An assessor should read and review supportively, looking for and rewarding those things done well in the entry or exercise.

For more information about understanding and interpreting your scores, please refer to **Part 1**.

Contents:

- Scoring Rubrics for Portfolio Entries
- Scoring Rubrics for Assessment Center Exercises

Scoring Rubrics for Portfolio Entries

Entry 1: Developing and Assessing Mathematical Thinking and Reasoning

In this entry: You choose two instructional activities and two student responses to each activity that demonstrate how you are able to design a sequence of learning experiences that builds on and gives you insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically. You also submit a Written Commentary that provides a context for your instructional choices and describes, analyzes, and reflects on your teaching.

THE LEVEL 4 performance provides *clear, consistent, and convincing* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

The Level 4 performance provides *clear, consistent, and convincing* evidence:

- that the teacher sets high, worthwhile, and appropriate learning goals for students based on detailed knowledge of students' interest, abilities, and needs and connects the instructional sequence to these goals.

The Level 4 performance provides evidence that the instructional activities are placed in the larger context of instruction that is designed to enhance student learning in mathematics.

- that the instructional sequence includes activities that are sequenced and organized to develop understanding of a substantive mathematical idea as the sequence unfolds while building on students' interest and prior knowledge. The sequencing of the activities is adept and the instruction is focused. The featured activities clearly and consistently promote mathematical reasoning on the part of students and are effective for eliciting responses that can affect instruction.
- of the teacher's deliberate intent to build students' conceptual understanding through the strength of the connections among each of the featured activities and the substantive mathematical idea, as well as the connection between the two featured activities.
- that the teacher is able to integrate assessment into instruction and use strategies to probe and push students' mathematical thinking, particularly by providing feedback that includes targeted questions or instructive comments designed to encourage students to use and develop appropriate mathematical written communication, reasoning, and thinking. The analysis of student responses is detailed, specific, and accurate, showing differentiated insight into individual students' learning over time. The feedback and next steps provided to students are rich, detailed, and instructive, moving students toward greater understanding of the featured mathematical concept.
- of the connections among the concept of study, the instructional activities, the analysis of student responses, and the appropriate feedback and next steps for the students.

- of the teacher's own knowledge of mathematics and mathematics pedagogy, as shown through the selection of the concept, the way it is taught, and the teacher's analysis and response to the student work.
- that the teacher is able to accurately describe his or her own practice, analyze it fully and thoughtfully, and reflect on its implications and significance for future practice.

Overall, the Level 4 performance provides *clear, consistent, and convincing* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

THE LEVEL 3 performance provides *clear* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

The Level 3 performance provides *clear* evidence:

- that the teacher sets appropriate learning goals for students based on knowledge of students' interest, abilities, and needs and connects the instructional sequence to these goals.
- that the instructional activities are placed in the larger context of instruction that is designed to enhance student learning in mathematics.
- that the instructional sequence includes activities that are sequenced and organized to develop understanding of a substantive mathematical idea as the sequence unfolds while building on students' interest and prior knowledge. The featured activities promote mathematical reasoning on the part of students and are effective for eliciting responses that can affect instruction.
- of the teacher's intent to build students' conceptual understanding through the connections among each of the featured activities and the substantive mathematical idea, as well as the connection between the two featured activities.
- that the teacher is able to integrate assessment into instruction and use strategies to probe and push students' mathematical thinking, particularly by providing feedback that includes targeted questions or instructive comments designed to encourage students to use and develop appropriate mathematical written communication, reasoning, and thinking. The analysis of student responses is accurate, showing insight into individual students' learning over time. The feedback and next steps provided to students are instructive.
- of the teacher's own knowledge of mathematics and mathematics pedagogy, as shown through the selection of the concept, the way it is taught, and the teacher's analysis and response to the student work.
- that the teacher is able to accurately describe and analyze his or her own practice and reflects on its implications and significance for future practice.

The Level 3 performance may show imbalance or unevenness in the different sources of evidence or in different parts of the analysis. One part of the performance may be more indicative of accomplished practice than another, but overall, there is *clear* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

THE LEVEL 2 performance provides *limited* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

The Level 2 performance provides *limited* evidence:

- that the teacher sets appropriate learning goals for students and connects the instructional sequence to these goals. The goals for student learning may be vaguely articulated, of limited significance, or only loosely related to the instruction or student needs.
- that the instructional sequence includes activities that develop students' understanding of a substantive mathematical idea, but thought given to the sequencing of activities may not be evident. The connections to students' prior knowledge may not be clear, and/or the connection to the mathematical concept may not be strong. Though generally addressing the featured mathematical concept, the learning activities may not clearly promote mathematical reasoning on the part of students and may be more procedural or computational in their focus, rather than conceptually focused. The activities may be only somewhat effective in eliciting significant information about student understanding.
- that the teacher furthers students' mathematical understanding through his or her analysis and assessment of students' responses to the instructional activity/prompt. The teacher shows limited knowledge of students and limited insight into their learning. Though generally accurate, the analysis of student responses is limited in its scope and specificity and may not address conceptual elements of the work that merit attention. The feedback and next steps provided to students may be general, non-specific or incomplete.
- of the teacher's own knowledge of mathematics and mathematics pedagogy.
- that the teacher is able to describe and analyze his or her practice, but the reflection may be vague, general, or focused solely on the procedural aspects of teaching.

The Level 2 performance may be characterized by evidence that hints at accomplished practice, but is too fragmented or uneven to support a classification as a Level 3 performance. Overall, there is *limited* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

THE LEVEL 1 performance provides *little or no* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

The Level 1 performance provides *little or no* evidence:

- that the teacher sets appropriate learning goals for students and connects the instructional sequence to these goals. The goals for student learning may not be goals at all, but rather activities. When stated, the goals are vague, trivial, inappropriate, or not connected to the instruction or student needs.
- that the instructional sequence includes activities that develop students' understanding of a substantive mathematical idea. The sequencing of activities may be illogical or extremely disjointed, and the activities may not address the selected concept.
- of connections to students' prior knowledge. The learning activities do not promote mathematical reasoning on the part of students and may be entirely procedural or computational in their focus, rather than conceptually focused. The activities may not be useful for gaining significant insight into student understanding. The learning experiences may consist entirely of closed-ended, trivial activities.
- that the teacher furthers students' mathematical understanding through his or her analysis and assessment of students' responses to the instructional activity/prompt. The teacher shows little or no knowledge of students and little or no insight into their learning. The analysis of student responses may consist solely of what students got "right" and "wrong," or may focus on criteria outside the stated learning goals. The analysis may fail to recognize students' progress and instead focus on students' "mistakes," or it may be so superficial that it misses important elements of the work that merit attention. The feedback and next steps provided to students may be absent or inappropriate.
- of the teacher's own knowledge of mathematics and mathematics pedagogy; serious misconceptions about mathematics may be evident.
- that the teacher is able to reflect on his or her practice. The reflection may be missing or disconnected from the instructional evidence.

Overall, there is *little or no* evidence that the teacher is able to design a sequence of learning experiences that builds on and gives insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically.

Entry 2: Instructional Analysis: Whole-Class Mathematical Discourse

In this entry: You provide a 15-minute video recording of a lesson that demonstrates how you use a classroom discussion and targeted questioning to develop student understanding about an important mathematical idea. You provide evidence of your ability to engage students in mathematical discourse as the whole class investigates, explores, or discovers important mathematical concepts, procedures, or reasoning processes within a stimulating and inclusive environment that promotes student development of mathematical power. You also provide a Written Commentary analyzing the video recording and instructional materials and reflecting on the lesson from which the video recording was taken.

THE LEVEL 4 performance provides *clear, consistent, and convincing* evidence that the teacher is able to engage a class of students in mathematical discourse about an important idea in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

The Level 4 performance provides *clear, consistent, and convincing* evidence:

- that the teacher sets high, worthwhile, and appropriate goals for student learning based on detailed knowledge of students' needs, interests, and abilities and connects instruction to those goals.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics and develop students' mathematical power, based on the teacher's own deep knowledge of mathematics and pedagogy.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment in which students are fully engaged in learning, as shown through both verbal and nonverbal signs of interest and involvement. Mathematical discourse is facilitated by the teacher's use of carefully crafted questions and prompts that elicit mathematical thinking and reasoning from students, ongoing informal assessment of student learning, and adjustments to instruction as warranted by that assessment. Discourse on the video recording is characterized by active, dynamic verbal exchange, with students' questions, conjectures, and interactions (teacher-student and student-student) demonstrating mathematical reasoning and communication.
- that feedback to students is frequent and supportive and enhances student learning.
- that the teacher is able to accurately describe and analyze student interactions and thinking, demonstrating deep knowledge of students as individual learners and insight into student learning.
- that the teacher is able to describe his or her practice accurately, analyze it fully and thoughtfully, and reflect on its implications and significance for future teaching.

Overall, there is *clear, consistent, and convincing* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

THE LEVEL 3 performance provides *clear* evidence that the teacher is able to engage a class of students in mathematical discourse about an important idea in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

The Level 3 performance provides *clear* evidence:

- that the teacher sets appropriate goals for student learning based on knowledge of students' needs, interests, and abilities and connects instruction to those goals.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics and develop students' mathematical power, based on the teacher's own knowledge of mathematics and pedagogy.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment in which students are engaged in learning, as shown through both verbal and nonverbal signs of interest and involvement. Mathematical discourse is facilitated by the teacher's use of questions and prompts that elicit mathematical thinking and reasoning from students.
- of ongoing informal assessment of student learning and adjustments to instruction as warranted by that assessment. Discourse on the video recording is characterized by verbal exchange, with students' questions, conjectures, and interactions (teacher-student and student-student) demonstrating mathematical reasoning and communication.
- that feedback to students enhances student learning.
- that the teacher is able to accurately describe and analyze student interactions and thinking, demonstrating knowledge of students as individual learners.
- that the teacher is able to accurately describe and analyze his or her own practice and reflect on its implications and significance for future practice.

The Level 3 performance may show imbalance or unevenness in the different sources of evidence or in different parts of the analysis. One part of the performance may be more indicative of accomplished practice than another, but overall, there is *clear* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

THE LEVEL 2 performance provides *limited* evidence that the teacher is able to engage a class of students in mathematical discourse about an important idea in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

The Level 2 performance provides *limited* evidence:

- that the teacher sets appropriate goals for student learning and connects instruction to those goals. The goals for student learning may be vaguely articulated, of limited significance, or only loosely related to the instruction or student needs.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics. Though the instructional sequence does generally address the selected mathematical topic, the sequence may be vaguely articulated. Evidence of the teacher's knowledge of mathematics and pedagogy may be limited.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment. Students' engagement in the discussion may be limited. Though generally on-topic, the discourse on the video recording may not demonstrate strong mathematical communication by students or the teacher. Discourse may be dominated by teacher-student interactions, with limited evidence of student-student exchange. The teacher's use of questions and prompts may not support mathematical thinking and reasoning from students, and instead may be more formulaic, computational, or procedural. Evidence of informal assessment of student learning during the lesson is limited.
- that the teacher provides feedback to students, but the feedback may be infrequent, general, or incomplete.
- that the teacher is able to describe and analyze student interactions and thinking. Though generally accurate, the analysis of student interactions is limited in its scope and specificity and may not address conceptual aspects of the discussion that merit attention.
- that the teacher is able to reflect on his or her practice, but the reflection may be vague, general, focused solely on procedural aspects of teaching, or show limited understanding of implications for future teaching.

The Level 2 performance may be characterized by evidence that hints at accomplished practice, but is too fragmented or uneven to support a classification as a Level 3 performance. Overall, there is *limited* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

THE LEVEL 1 performance provides *little or no* evidence that the teacher is able to engage a class of students in mathematical discourse about an important idea in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

The Level 1 performance provides *little or no* evidence:

- that the teacher sets appropriate goals for student learning and connects instruction to those goals. The goals for student learning may not be goals at all, but rather activities. When stated, the goals are vague, trivial, inappropriate, or not connected to the instruction or student needs.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics or develop students' mathematical power. The instructional sequence may not directly address the selected mathematical topic.
- of the teacher's knowledge of mathematics and pedagogy; there may be evidence of serious misconceptions about mathematics on the part of the teacher.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment. Students show little or no engagement in the discussion. The discourse on the video recording may show little or no mathematical focus or very weak mathematical communication by students and the teacher. Discourse may be entirely dominated by the teacher, whether questioning or lecturing, to the degree that it is not a discussion at all. The teacher's use of questions and prompts does not support mathematical thinking and reasoning from students and is instead entirely closed-ended, focused on getting trivial "right answers."
- of informal assessment of student learning during the lesson, as obvious student misconceptions go unaddressed in the lesson and in the commentary.
- that the teacher provides supportive feedback to students; if feedback is provided, it may be negative or incorrect.
- that the teacher is able to accurately describe and analyze student interactions and thinking. The analysis may fail to recognize student understanding and instead focus on students' "mistakes," or it may be superficial.
- of the teacher's ability to engage in reflective thinking about students or his or her instruction. The reflection may be missing or unconnected from the instructional evidence.

Overall, there is *little or no* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

Entry 3: Instructional Analysis: Small-Group Mathematical Collaborations

In this entry: You provide a 15-minute video recording of a lesson that demonstrates how you interact with students working in small groups in order to promote mathematical discourse and to develop student understanding about an important mathematical idea. You are required to show how you use manipulative materials or appropriate technology to provide access to or deepen mathematical understanding. You also show how you model questioning strategies and mathematical thinking and reasoning processes to promote interactions between you and the students, as well as among the students in small groups. You provide a Written Commentary analyzing the video recording and instructional materials and reflecting on the lesson from which the video recording was taken.

THE LEVEL 4 performance provides *clear, consistent, and convincing* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

The Level 4 performance provides *clear, consistent, and convincing* evidence:

- that the teacher sets worthwhile and appropriate learning goals for student learning and connects instruction to those goals.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics and that the teacher bases the lesson on the teacher's own knowledge of mathematics, mathematics teaching, and students. The instruction is adeptly designed and focused.
- that the teacher engages students in collaborative learning as they work with each other about a mathematical topic in small groups within the classroom.
- from the video recording that students are involved in discourse about mathematics.
- of the teacher's facilitation of group work so that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction and uses a variety of strategies to probe and push students' thinking, particularly by asking targeted questions designed to encourage students to use and develop appropriate mathematical discourse.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- that the teacher tailors students' instruction, where appropriate, to take into account students' different experiences, circumstances, language proficiencies, and needs.
- that the teacher is able to effectively use appropriate manipulative materials and/or technologies to enhance student learning in light of the learning goals and mathematical thinking and reasoning, and has a strong rationale for using such instructional resources.
- that the teacher is able to accurately describe, analyze, and evaluate students' work showing knowledge of students and insight into learning.

- that the teacher is able to accurately describe her or his practice, analyze it fully and thoughtfully, and reflect on its implications and significance, recognizing highs and lows, if any, of the lesson and to articulate, where appropriate, well-thought-out ideas for improvement or change in practice based on the analysis.

Overall, there is *clear, consistent, and convincing* evidence that the teacher is able to use small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

THE LEVEL 3 performance provides *clear* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

The Level 3 performance provides *clear* evidence:

- that the teacher sets worthwhile and appropriate goals for student learning and connects instruction to those goals.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics and that the teacher bases the lesson on the teacher's own knowledge of mathematics, mathematics teaching, and students.
- that the teacher engages students in collaborative learning as they work with each other about a mathematical topic in small groups within the classroom.
- from the video recording that students are involved in discourse about mathematics.
- of the teacher's facilitation of group work so that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction, and uses a variety of strategies to probe and push students' thinking, particularly by asking targeted questions designed to encourage students to use and develop appropriate mathematical discourse.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- that the teacher tailors students' instruction, where appropriate, to take into account students' different experiences, circumstances, language proficiencies, and needs.
- that the teacher is able to use appropriate manipulative materials and/or technologies to enhance student learning in light of the learning goals and mathematical thinking and reasoning, and has an appropriate rationale for using such instructional resources.
- that the teacher is able to accurately describe, analyze, and evaluate students' work showing knowledge of students and insight into learning.
- that the teacher is able to accurately describe and analyze her or his practice and reflect on its implications and significance, recognizing highs and lows, if any, of the lesson and to articulate, where appropriate, well-thought-out ideas for improvement or change in practice based on the analysis.

A Level 3 performance may show imbalance in the different sources of evidence or in different parts of the analysis. One part of the performance may be more indicative of accomplished practice than another, but viewed as a whole, there is *clear* evidence that the teacher is able to use small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

THE LEVEL 2 performance provides *limited* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

The Level 2 performance provides *limited* evidence:

- that the teacher sets appropriate goals for student learning and connects instruction to those goals. The goals for student learning may be vague, of limited significance, or only loosely related to instruction.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics. The instruction may provide only limited evidence of the teacher's own knowledge of mathematics, mathematics teaching, and students.
- from the video recording that students are involved in discourse about mathematics. Evidence of collaboration among students or that students are at least partly responsible for their own learning and that of their peers is limited.
- that the teacher informally assesses student understanding during instruction, and there is limited evidence of the teacher's use of a variety of strategies to probe and push students' thinking. Though focused generally on mathematics, discourse in the small groups may be characterized chiefly by "right answer" questions, recall of information, a lack of focus, or limited interaction between and among students.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- of the teacher's knowledge of students and insight into learning, with little differentiation among learners.
- that the teacher is able to use manipulative materials and/or technologies to further learning goals and mathematical thinking and reasoning. The manipulative materials and/or technology used may be loosely connected to instruction.
- that the teacher is able to accurately describe, analyze, and evaluate students' work and shows limited knowledge of students and limited insight into learning.
- that the teacher is able to describe her or his practice, analyze it fully, and reflect on its implications. The reflection may be global or sketchy and show limited understanding of implications for future teaching.

A Level 2 performance may be characterized by evidence that hints at accomplished practice, but overall, there is *limited* evidence that the teacher is able to use small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

THE LEVEL 1 performance provides *little or no* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

The Level 1 performance provides *little or no* evidence:

- that the teacher sets appropriate learning goals for student learning and connects instruction to those goals. The goals for student learning may not be goals at all, but rather activities. When stated, goals are vague, trivial, inappropriate, or unconnected to instruction.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics. The performance may not address mathematics at all, or mathematical topics may be covered in an extremely superficial and disjointed manner.
- of the teacher's own knowledge of mathematics, mathematics teaching, and students. There may be evidence of serious misconceptions about mathematics on the teacher's part.
- from the video recording that students are involved in discourse about mathematics.
- of collaboration among students or that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction and there is little or no evidence of the teacher's use of a variety of strategies to probe and push students' thinking. The activities featured on the video recording may not be small-group activities at all or may not address mathematics.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- of the teacher's knowledge of students and insight into learning, with little or no differentiation among learners. The interactions may reveal inappropriate, negative responses to students. Or, the questioning techniques employed by the teacher may be entirely close-ended and focused on a superficial aspect of the topic under study.
- that the teacher is able to use manipulative materials and/or technologies to further learning goals and mathematical thinking and reasoning. The manipulative materials and/or technology used may be disconnected from instruction.
- that the teacher is able to accurately describe, analyze, and evaluate students' work and shows little or no knowledge of students and little or no insight into learning.
- that the teacher is able to describe her or his practice, analyze it fully, and reflect on its implications. The reflection may be missing or unconnected from the instructional evidence and show little or no understanding of implications for future teaching.

Overall, there is *little or no* evidence that the teacher is able to use small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

Entry 4: Documented Accomplishments: Contributions to Student Learning

In this entry: You illustrate your partnerships with students' families and community, and your development as a learner and collaborator with other professionals by submitting descriptions and documentation of your activities and accomplishments in those areas. Your description must make the connection between each accomplishment and its impact on student learning.

THE LEVEL 4 performance provides *clear, consistent, and convincing* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

The Level 4 performance provides *clear, consistent, and convincing* evidence:

- that the teacher treats parents and other interested adults as valued partners in the child's education, and uses thoughtfully chosen, appropriate strategies for reaching out to the families of his or her students. The selected strategies may or may not be original to the teacher, but they are implemented with skill and enthusiasm and are effective in engaging parents and other interested adults in communication that is highly interactive, fostering extensive two-way dialogue focused primarily on substantive teaching and learning issues and individual student progress.
- that the teacher facilitates ongoing, mutually beneficial communications between students and the wider community in a way that enhances teaching and learning.
- that the teacher has strengthened his or her own teaching practice through conscious and deliberate professional development to strengthen knowledge, skills, and abilities in areas that are relevant to his or her teaching and learning context for the purpose of impacting student learning.
- that the teacher has worked collaboratively with colleagues to improve teaching and learning, either within the school or in the wider professional community.
- that the teacher has shared his or her expertise in a leadership role with other educators through facilitating the professional development of other teachers, improving instructional practices, or advocating for positive change in educational policy.
- that the teacher's work outside the classroom has been driven by a conscious and deliberate focus on improving teaching and learning, as opposed to merely fulfilling job requirements. The descriptions and documentation provide a rich, detailed, coherent view of a teacher who has made an impact on student learning through work with other colleagues, professionals, families, and the community, and as a learner.
- that the teacher accurately analyzes and thoughtfully reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *clear, consistent, and convincing* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

THE LEVEL 3 performance provides *clear* evidence of the teacher’s ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

The Level 3 performance provides *clear* evidence:

- that the teacher treats parents and other interested adults as valued partners in the child’s education, and uses appropriate strategies for reaching out to the families of his or her students. The selected strategies may or may not be original to the teacher, but they are effective in engaging parents and other interested adults in communication that is interactive, fostering two-way dialogue focused primarily on substantive teaching and learning issues and individual student progress.
- that the teacher facilitates ongoing, mutually beneficial communications between students and the wider community in a way that enhances teaching and learning.
- that the teacher has strengthened his or her own teaching practice through conscious and deliberate professional development to strengthen knowledge, skills, and abilities in areas that are relevant to his or her teaching and learning context.
- that the teacher has worked with colleagues as a partner or collaborator to improve teaching and learning, either within the school or in a larger professional context, such as within a professional organization.
- that the teacher has shared his or her expertise in a leadership role with other educators through facilitating the professional development of other teachers, improving instructional practices, or advocating for positive changes in educational policy.
- that the teacher’s work outside the classroom has been driven by a conscious focus on improving teaching and learning, as opposed to merely fulfilling job requirements. The descriptions and evidence provide a coherent view of a teacher who has made an impact on student learning through work with other colleagues, professionals, families, and the community, and as a learner.
- that the teacher accurately analyzes and thoughtfully reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *clear* evidence of the teacher’s ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

THE LEVEL 2 performance provides *limited* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

The Level 2 performance provides *limited* evidence:

- that the teacher treats parents and other interested adults as valued partners in the child's education, and uses appropriate strategies for reaching out to the families of his or her students. The rationale for the selected strategies may be a bit vague and/or there may be limited evidence that the strategies are effective in engaging parents and other interested adults. There may be evidence that though the strategies work with many families, some families are not being fully engaged.
- that the communications with families are focused on substantive teaching and learning issues. Instead, many of the communications may be dominated by procedural issues, behavior, or disciplinary matters, or the communications may not show much differentiation between individual students, with the same communication going to all families.
- that the communications with families are interactive. There may be frequent communications home but these may rely primarily on one-way media, such as notes home or newsletters. The evidence may suggest that parents are well informed about what is going on in the classroom, but there is limited evidence of two-way dialogue with families. There is limited evidence regarding meaningful communications between the students and the wider community for the purpose of enhancing teaching and learning.
- that the teacher has strengthened his or her own teaching practice through professional development; even if the teacher has engaged in extensive professional development activities, it may be unclear how these activities relate to the knowledge, skills, and abilities that are relevant to his or her teaching and learning context.
- that the teacher has shared what he or she has learned with colleagues by working with them in a role as a partner, collaborator, or leader.

The evidence in a Level 2 performance may indicate that the teacher is an accomplished practitioner within his or her own classroom, but that he or she has not shared his or her expertise with others in a significant way through professional development of other teachers, improving instructional practices, or advocating for positive change in educational policy.

The evidence may suggest that the preponderance of the teacher's activities outside of the classroom has been to fulfill job requirements, as opposed to being a conscious and deliberate effort to impact student learning and improve teaching and learning.

- that the teacher analyzes and reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

The Level 2 performance may be characterized by evidence that occasionally hints at accomplished practice, but overall, there is *limited* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

THE LEVEL 1 performance provides *little or no* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

The Level 1 performance provides *little or no* evidence:

- that the teacher treats parents and other interested adults as partners in the child's education, and uses appropriate strategies for reaching out to the families of his or her students. The rationale for the selected strategies may be very vague, unclear, or absent.
- that the strategies are effective in engaging parents and other interested adults. There may be evidence that some families are overlooked or ignored.
- that the communications with families are focused on substantive teaching and learning issues. Instead, the communications are taken up almost exclusively by procedural issues, behavior, or disciplinary matters.
- that the communications with families are interactive. Communications with families are entirely one-way and/or infrequent. Parents may not be kept informed about what is going on in the classroom. If evidence regarding outreach to the wider community is present, the connections may promote trivial interactions with little impact on student learning.

The Level 1 performance may contain negative or disparaging comments about parents, community, or professionals with little or no evidence of the teacher's efforts to improve the situation.

- that the teacher has strengthened his or her own teaching practice through professional development. If professional development activities are cited, they may be very sketchy or weak or of little or no relevance to the teacher's context.
- that the teacher has worked with colleagues as a partner, collaborator, or leader. If school projects are cited, there may be little or no evidence of their impact on teaching and learning, or the teacher's role in the project may be very unclear or very passive.

There may be evidence that the teacher is an accomplished practitioner within his or her own classroom, but there is little or no evidence that he or she has shared his or her expertise with others.

The evidence may suggest that the teacher's work outside of the classroom has been carried out solely to fulfill job requirements, as opposed to being a conscious and deliberate effort to improve teaching and learning.

- that the teacher analyzes and reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *little or no* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

Scoring Rubrics for Assessment Center Exercises

Exercise 1: Algebra

In this exercise: You demonstrate knowledge of theoretical, graphical, and symbolic representations of functions, and the interrelationships that exist between two concepts in algebra.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence that for a given problem situation, the candidate can provide an accurate model and find its solution; graph the equations/inequalities and interpret the graph; and provide an accurate and thorough explanation of the interrelationships that exist between two algebraic concepts.

Characteristics:

- Explanation is thorough and accurate.
- Model includes an algebraic equation and fully and accurately represents the situation; solutions are accurate and complete.
- Graph is accurate and complete.
- Interpretation is logical and appropriate.

THE LEVEL 3 response provides *clear* evidence that for a given problem situation, the candidate can provide an accurate model and find its solution; graph the equations/inequalities and interpret the graph; and provide an accurate and thorough explanation of the interrelationships that exist between two algebraic concepts.

Characteristics:

- Explanation is accurate, though may be lacking detail.
- Model includes an algebraic equation and accurately represents the situation, though may be lacking detail; solutions are accurate and complete, though may have minor errors.
- Graph is accurate, though may be lacking detail.
- Interpretation is appropriate, though may be lacking detail.

THE LEVEL 2 response provides *limited* evidence that for a given problem situation, the candidate can provide an accurate model and find its solution; graph the equations/inequalities and interpret the graph; and provide an accurate and thorough explanation of the interrelationships that exist between two algebraic concepts.

Characteristics:

- Explanation is somewhat illogical or misses important detail.
- Model may not include an algebraic equation and is somewhat inaccurate or incomplete in its representation of the situation; solutions are somewhat inaccurate or incomplete.
- Graph is somewhat inaccurate or incomplete.
- Interpretation is somewhat inappropriate.

THE LEVEL 1 response provides *little or no* evidence that for a given problem situation, the candidate can provide an accurate model and find its solution; graph the equations/inequalities and interpret the graph; and provide an accurate and thorough explanation of the interrelationships that exist between two algebraic concepts.

Characteristics:

- Explanation is illogical and contains a major misconception.
- Model may not include an algebraic equation and is inaccurate or incomplete in its representation of the situation; solutions are inaccurate or incomplete.
- Graph is inaccurate and incomplete.
- Interpretation is somewhat inappropriate.

Exercise 2: Calculus

In this exercise: You demonstrate knowledge of limits and continuity, differentiation and integration, and the ability to apply the knowledge to meaningful situations.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence of the ability to identify discontinuities, evaluate and provide rationales for limits, interpret relationships between graphs of $f(x)$ and $f'(x)$, and apply a definite integral to areas of bounded regions.

Characteristics:

- accurate identification of location and type of discontinuities, and accurate evaluations and complete rationales for given limits
- accurate and substantiated identification of intervals and/or points
- accurate identification and evaluation of a graph's definite integral; and accurate interpretation of the graph's definite integral

THE LEVEL 3 response provides *clear* evidence of the ability to identify discontinuities, evaluate and provide rationales for limits, interpret relationships between graphs of $f(x)$ and $f'(x)$, and apply a definite integral to areas of bounded regions.

Characteristics:

- accurate identification of location and type of discontinuities, and accurate evaluations and rationales for given limits, though response may exhibit minor flaws
- accurate and substantiated identification of intervals and/or points, though there may be minor flaws
- accurate identification and evaluation of a graph's definite integral; and somewhat accurate interpretation of the graph's definite integral, though the interpretation may be vague

THE LEVEL 2 response provides *limited* evidence of the ability to identify discontinuities, evaluate and provide rationales for limits, interpret relationships between graphs of $f(x)$ and $f'(x)$, and apply a definite integral to areas of bounded regions.

Characteristics:

- inaccurate identification of location and type of some discontinuities, and somewhat inaccurate evaluations and rationales for given limits
- partially inaccurate identification of intervals and/or points; rationales may be weak or partially inaccurate
- identification and evaluation of a graph's definite integral may be partially accurate, and interpretation of the graph's definite integral may be inaccurate or missing

THE LEVEL 1 response provides *little or no* evidence of the ability to identify discontinuities, evaluate and provide rationales for limits, interpret relationships between graphs of $f(x)$ and $f'(x)$, and apply a definite integral to areas of bounded regions.

Characteristics:

- inaccurate identification of location and type of discontinuities, and inaccurate evaluations and incomplete or missing rationales for given limits
- inaccurate and/or unsubstantiated identification of intervals and/or points
- inaccurate identification and evaluation of a graph's definite integral; and inaccurate or missing interpretation of the graph's definite integral

Exercise 3: Discrete Mathematics

In this exercise: You demonstrate knowledge of sequence and series, probability, and counting theory.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence of the ability to (1) generate arithmetic and geometric sequences, identify given terms in sequences, and use sigma notation; (2) apply various counting principles; and (3) create a model of a given problem situation, find relevant probabilities, and interpret a given probability in terms of the problem.

Characteristics:

- accurate and complete arithmetic and geometric sequences, accurately identified terms, and accurately written sigma notation
- accurate and appropriate application of various counting principles
- an appropriate visual model of a given problem situation, accurate relevant probabilities, and appropriate interpretation of a given probability in terms of the problem

THE LEVEL 3 response provides *clear* evidence of the ability to (1) generate arithmetic and geometric sequences, identify given terms in sequences, and use sigma notation; (2) apply various counting principles; and (3) create a model of a given problem situation, find relevant probabilities, and interpret a given probability in terms of the problem.

Characteristics:

- accurate and complete arithmetic and geometric sequences, accurately identified terms, and accurately written sigma notation, though there may be minor flaws in the sequences, terms, or sigma notation
- accurate and appropriate application of various counting principles, though there may be minor flaws in either reasoning or computations
- an appropriate visual model of a given problem situation, accurate relevant probabilities, and appropriate interpretation of a given probability in terms of the problem, though there may be minor flaws in the model, probabilities, or interpretation

THE LEVEL 2 response provides *limited* evidence of the ability to (1) generate arithmetic and geometric sequences, identify given terms in sequences, and use sigma notation; (2) apply various counting principles; and (3) create a model of a given problem situation, find relevant probabilities, and interpret a given probability in terms of the problem.

Characteristics:

- arithmetic and geometric sequences are somewhat inaccurate or incomplete, given terms are inaccurately identified, or sigma notation is inaccurately written
- somewhat inaccurate application of counting principles
- a somewhat inappropriate visual model of a given problem situation, inaccurate relevant probabilities, and incorrect or inappropriate interpretation of a given probability in terms of the problem

THE LEVEL 1 response provides *little or no* evidence of the ability to (1) generate arithmetic and geometric sequences, identify given terms in sequences, and use sigma notation; (2) apply various counting principles; and (3) create a model of a given problem situation, find relevant probabilities, and interpret a given probability in terms of the problem.

Characteristics:

- arithmetic and geometric sequences are inaccurate or incomplete, given terms are inaccurately identified, and sigma notation is inaccurately used
- inaccurate application of counting principles
- inappropriate or inaccurate visual model of a given problem situation, inaccurate relevant probabilities, and incorrect and/or inappropriate interpretation of a given probability in terms of the problem

Exercise 4: Geometry

In this exercise: You demonstrate the ability to use deductive reasoning to construct a proof, explain the interrelationships between two important concepts in geometry, and apply measurement formulas to a three-dimensional figure generated by the rotation of a two-dimensional figure about an axis.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence of the ability to construct a proof, explain the relationship between two important geometric concepts, and express the volume of a solid generated by the rotation of a two-dimensional object about an axis.

Characteristics:

- a thorough and accurate proof, including appropriate justifications for any inferences made
- a logical and thorough explanation of the relationship between two important concepts in geometry
- a logical process leading to an accurate solution of a measurement problem

THE LEVEL 3 response provides *clear* evidence of the ability to construct a proof, explain the relationship between two important geometric concepts, and express the volume of a solid generated by the rotation of a two-dimensional object about an axis.

Characteristics:

- a logical proof, including justifications for any inferences made, though the justifications may be incomplete
- a logical explanation of the relationship between two important concepts in geometry
- a logical process leading to an accurate solution of a measurement problem, though there may be a minor flaw in either the process or solution

THE LEVEL 2 response provides *limited* evidence of the ability to construct a proof, explain the relationship between two important geometric concepts, and express the volume of a solid generated by the rotation of a two-dimensional object about an axis.

Characteristics:

- an incomplete or inaccurate proof, with some inappropriate justifications for inferences made
- a somewhat incomplete or inaccurate explanation of the relationship between two important concepts in geometry
- a somewhat flawed process leading to an inaccurate solution of a measurement problem

THE LEVEL 1 response provides *little or no* evidence of the ability to construct a proof, explain the relationship between two important geometric concepts, and express the volume of a solid generated by the rotation of a two-dimensional object about an axis.

Characteristics:

- an inaccurate or missing proof, with either misconceived or missing justifications for any inferences made
- a conceptually misconceived or missing explanation of the relationship between two important concepts in geometry
- a significantly flawed process leading to an inaccurate or missing solution of a measurement problem

Exercise 5: Statistics and Data Analysis

In this exercise: You demonstrate knowledge of statistics and data analysis to graph a normal distribution of a given situation and find various probabilities; identify and explain types of association, effects on trend lines, and values of correlation coefficients; graph and provide a numerical analysis of given data; and explain an important statistical concept.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence of the ability to graph and provide a numerical analysis of given data; identify and explain types of association, effects on trend lines, and values of correlation coefficients; and graph a normal distribution of a given situation and find various probabilities.

Characteristics:

- accurate graphing and analysis of a given set of data
- accurate interpretations and modeling for given statistical characteristics
- accurate estimation of probabilities

THE LEVEL 3 response provides *clear* evidence of the ability to graph and provide a numerical analysis of given data; identify and explain types of association, effects on trend lines, and values of correlation coefficients; and graph a normal distribution of a given situation and find various probabilities.

Characteristics:

- mostly accurate graphing and analysis of a given set of data
- mostly accurate interpretations and modeling for given statistical characteristics
- mostly accurate estimation of probabilities

THE LEVEL 2 response provides *limited* evidence of the ability to graph and provide a numerical analysis of given data; identify and explain types of association, effects on trend lines, and values of correlation coefficients; and graph a normal distribution of a given situation and find various probabilities.

Characteristics:

- significantly flawed graphing and analysis of a given set of data
- significantly flawed interpretations and modeling for given statistical characteristics
- significantly flawed estimation of probabilities

THE LEVEL 1 response provides *little or no* evidence of the ability to graph and provide a numerical analysis of given data; identify and explain types of association, effects on trend lines, and values of correlation coefficients; and graph a normal distribution of a given situation and find various probabilities.

Characteristics:

- mostly inaccurate or missing graphing and analysis of a given set of data
- mostly inaccurate or missing interpretations and modeling for given statistical characteristics
- mostly inaccurate or missing estimation of probabilities

Exercise 6: Families of Functions

In this exercise: You use your knowledge of families of functions to analyze the characteristics of a function and the relationship between a function and its inverse function. You graph a function and its inverse and discuss how the graphs are related to each other. You also find a symbolic representation of the inverse function and demonstrate that the symbolic representation found is the inverse function.

THE LEVEL 4 response provides *clear, consistent, and convincing* evidence of the ability to produce an accurate graph of the given function and its inverse, to analyze the relationship between the function and its inverse, to find a symbolic representation of the inverse, and to demonstrate that the representation found is the inverse function.

Characteristics:

- complete and accurate graph of the given function and a correct identification of the domain and range of the function;
- complete and accurate graph of the inverse function and a thorough discussion of the relationship between the given function and its inverse;
- complete and accurate symbolic representation of the inverse function; and
- valid and complete demonstration that the symbolic representation found is the inverse of the given function.

THE LEVEL 3 response provides *clear* evidence of the ability to produce an accurate graph of the given function and its inverse, to analyze the relationship between the function and its inverse, to find a symbolic representation of the inverse, and to demonstrate that the representation found is the inverse function.

Characteristics:

- accurate graph of the given function and a correct identification of the domain and range of the function;
- mostly accurate graph of the inverse function, though it may be lacking in minor details; accurate discussion of the relationship between the given function and its inverse;
- symbolic representation of the inverse of the function is found but may have minor errors; and
- appropriate demonstration that the symbolic representation found is the inverse of the given function, but may be lacking in detail.

THE LEVEL 2 response provides limited evidence of the ability to produce an accurate graph of the given function and its inverse, to analyze the relationship between the function and its inverse, to find a symbolic representation of the inverse, and to demonstrate that the representation found is the inverse function.

Characteristics:

- graph of the given function may be inaccurate and lacking in important details; the identification of the domain or range may be inaccurate or incomplete;
- graph of the inverse function may be inaccurate and the discussion of the relationship between the given function and its inverse may be somewhat illogical and lacking in details;
- inaccurate symbolic representation of the inverse function; and
- invalid demonstration that the symbolic representation found is the inverse of the given function.

THE LEVEL 1 response provides little or no evidence of the ability to produce an accurate graph of the given function and its inverse, to analyze the relationship between the function and its inverse, to find a symbolic representation of the inverse, and to demonstrate that the representation found is the inverse function.

Characteristics:

- significantly flawed graph of the given function; incorrect identification of the domain and range;
- significantly flawed graph of the inverse function; inaccurate or incomplete discussion of the relationship between the given function and its inverse;
- symbolic representation of the inverse function is significantly flawed or missing; and
- significantly flawed or missing demonstration that the symbolic representation found is the inverse of the given function.

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A yellow swoosh graphic that starts under the 'P', goes up and over the 'A', and then swooshes down under the 'N'.

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