Adolescence and Young Adulthood/Mathematics

Component 1:
Content Knowledge

SAMPLE ITEMS AND SCORING RUBRICS

NATIONAL BOARD
for Professional Teaching Standards®

Prepared by Pearson for submission under contract with the
National Board for Professional Teaching Standards®
 AYA/Math-02

Contents

Overview

This document provides information about the Adolescence and Young Adulthood/ Mathematics (AYA/Mathematics) Component 1 computer-based assessment. It includes sample assessment center selected response items and answer key, constructed response exercises, and the scoring rubric used to assess each constructed response exercise.

Component 1: Content Knowledge

Component 1: Content Knowledge is a computer-based assessment requiring candidates to demonstrate knowledge of and pedagogical practices for their teaching content area. Candidates must demonstrate knowledge of developmentally appropriate content, which is necessary for teaching across the full age range and ability level of the chosen certificate area.

AYA/Mathematics Component 1 Computer-Based Assessment

In the AYA/Mathematics Component 1 computer-based assessment, content knowledge is assessed through the completion of approximately 45 selected response items and three constructed response exercises.

AYA/Mathematics Standards Measured by Selected Response Items

The AYA/Mathematics selected response items focus on the following Standards:

Standards Content (Standard II)	Approximate Percentage of Selected Response Item Section*
Contexts for Mathematics • Historical Development of Mathematical Ideas • Mathematical Applications in Fields Related to Mathematics • Precise Communication of Mathematical Ideas	15%
Problem Solving and Number Sense • Numbers and Operations • Algebra and Functions • Geometry	40%
Modeling and Analysis • Trigonometry • Discrete Mathematics • Data Analysis and Statistics • Calculus	45%

* These percentages are an approximation only. Following field testing and review of data, the final assessment will be created. The final assessment content may vary from these estimates.

For the complete AYA/Mathematics Standards, refer to **www.boardcertifiedteachers.org.**

AYA/Mathematics Constructed Response Exercises

The AYA/Mathematics constructed response exercises assess the following:

- **Exercise 1: Families of Functions**
  In this exercise, you will 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 will graph a function and its inverse and discuss how the graphs are related to each other. You will also find a symbolic representation of the inverse function and demonstrate that the symbolic representation found is the inverse function. You will be asked to respond to one prompt.
- **Exercise 2: Geometry**
  In this exercise, you will use your knowledge of geometry 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. You will be asked to respond to three prompts.
- **Exercise 3: Data Analysis and Statistics**
  In this exercise, you will use your knowledge of data analysis and statistics to analyze and graph a given set of data, interpret and model data for given statistical characteristics, and estimate probabilities. You will be asked to respond to three prompts.

Each constructed response exercise will be assessed using a scoring rubric. Each AYA/Mathematics Component 1 scoring rubric is derived from the Mathematics Standards for teachers of students ages 11–18+ and defines the levels of accomplished teaching that you must demonstrate.

You should read the rubric while preparing to take Component 1 to understand how the rubric guides assessors in evaluating your responses to the constructed response exercises.

Inside This Document

This document includes the following two sections: "Sample Selected Response Items and Answer Key for AYA/Mathematics Component 1" and "Sample Constructed Response Exercises and Scoring Rubrics for AYA/Mathematics Component 1."

Selected Response Section

This section includes the following:

- five sample selected response items
- answer key

Constructed Response Section

This section includes the following:

- three sample constructed response exercises
- associated scoring rubric for each exercise

For information about scheduling and taking your test at the assessment center, please refer to the *Assessment Center Policy and Guidelines*. For more information about how the assessment is scored, please refer to the *Scoring Guide*.

Sample Selected Response Items and Answer Key for AYA/Mathematics Component 1

This section includes

- **sample selected response items** to help you become familiar with the content and format of the items on an actual computer-based assessment.

  Although this section illustrates some of the types of items that appear on the assessment, note that these sample items do not necessarily define the content or difficulty of an entire actual assessment.

  Please note that the selected response items cover the *entire* age range of the certificate. Be aware that you are expected to demonstrate knowledge of developmentally appropriate content across the full range of your certificate.
- **reference material,** as appropriate, provided as part of the assessment, such as formula and constants pages and the periodic table.
- an **answer key.**

Sample Selected Response Items

1. The basis for the modern understanding of calculus, its vocabulary, and its notation began with Sir Isaac Newton and Gottfried Leibniz. Which pair of studies led to the recognition of the inverse relationship between the definite integral and the derivate?

   A. Newton's study of motion and Leibniz's study of infinitesimals
   B. Newton's study of gravity and Leibniz's study of infinitesimals
   C. Newton's study of motion and Leibniz's study of velocity
   D. Newton's study of gravity and Leibniz's study of velocity

2. Which of the following tables of values represents a quadratic equation that has two rational x-intercepts and a vertex above the x-axis?

A.

x	–5	–4	–3	–2	–1	0	1	2	3	4	5
y	–42	–29	–18	–9	–2	3	6	7	6	3	–2

B.

x	–5	–4	–3	–2	–1	0	1	2	3	4	5
y	–78	–56	–38	–24	–14	–8	–6	–8	–14	–24	–38

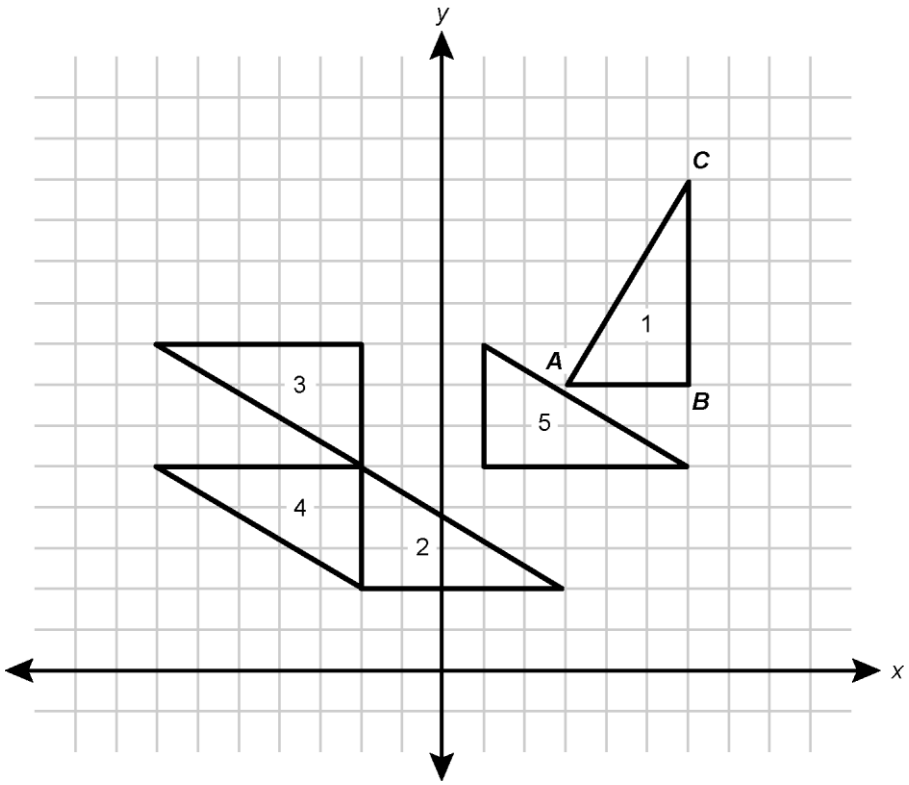
C.

x	–5	–4	–3	–2	–1	0	1	2	3	4	5
y	4	–2	–6	–8	–8	–6	–2	4	12	22	34

D.

x	–5	–4	–3	–2	–1	0	1	2	3	4	5
y	–144	–105	–172	–45	–24	–9	0	3	0	–9	–24

3. Triangle 1 is rotated counterclockwise 90° around point A and then translated 5 units left and 2 units down.



Which triangle is the result of this finite set of transformations performed on triangle 1?

A. triangle 2
B. triangle 3
C. triangle 4
D. triangle 5

4. An incomplete proof of a trigonometric identity is shown below.

Prove: sin (x – y) + sin (x + y) = 2 sinxcosy

sin (x – y) + sin (x + y) = ?

Which expression should replace the question mark as the next step in the proof?

A. sinxsiny – cosxcosy + sinxsiny + cosxcosy
B. sinxcosy – cosxsiny + sinxcosy + cosxsiny
C. cosxsiny – sinxcosy + cosxsiny + sinxcosy
D. cosxsiny – sinxcosy – cosxsiny – sinxcosy

5. What is the first derivative of the function $f(x) = \frac{4x}{x^2 - 7}$?

A. $f'(x) = \frac{-4x^2 - 28}{(x^2 - 7)^2}$

B. $f'(x) = \frac{12x^2 - 28}{(x^2 - 7)^2}$

C. $f'(x) = \frac{4x^2 + 28}{(x^2 - 7)^2}$

D. $f'(x) = \frac{-4x^2 - 28}{x^2 - 7}$

Answer Key to Sample Selected Response Items

Item Number	Correct Response
1	A
2	D
3	B
4	B
5	A

Sample Constructed Response Exercises and Scoring Rubrics for AYA/Mathematics Component 1

This section includes

- **sample constructed response exercises** to help you become familiar with the content and format of the exercises on an actual computer-based assessment. These exercises include instructions for using the computer, stimulus materials (if applicable), and prompts requiring responses.

  Although this section illustrates some of the types of exercises that appear on the assessment, note that these sample exercises do not necessarily define the content or difficulty of the exercises on an actual assessment.

  Please note these constructed response exercises cover the **entire** age range of the certificate. Be aware that you are expected to demonstrate knowledge of developmentally appropriate content across the full range of your certificate.

- **scoring rubrics** that are used by assessors in evaluating your responses to help you understand how your responses are assessed.

Sample Exercise 1 and Scoring Rubric

Sample Exercise 1

Exercise 1: Families of Functions - Candidate Name — Time Remaining 29:31

Families of Functions

Introduction

In this exercise, you will 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 will graph a function and its inverse and discuss how the graphs are related to each other. You will also find a symbolic representation of the inverse function and demonstrate that the symbolic representation found is the inverse function. You will be asked to respond to one prompt.

Criteria for Scoring

To satisfy the highest level of the scoring rubric, your response must provide clear, consistent, and convincing evidence of the following:

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

Directions

You may view the prompt by clicking the **Next** button. Compose your response in the space provided.

? Help | Navigator | Next →

Exercise 1: Families of Functions - Candidate Name

Time Remaining 29:31

Use the function $f(x) = 3\cos(2x)$, where $\{ x \mid 0 \le x \le \frac{\pi}{2} \}$ to respond to the prompt that follows.

You must address each of the following in your response to this prompt:

- Identify the domain and range of f and sketch a graph of $y = f(x)$. Identify the coordinates of any intercepts, maxima, and/or minima.
- Identify the domain and range of the inverse function of f, $f^{-1}(x)$, and sketch a graph of $y = f^{-1}(x)$. Explain how the domains, ranges, and the graphs of f and f^{-1} are related.
- Find a symbolic representation of $y = f^{-1}(x)$.
- Use composition of functions to demonstrate that the symbolic form of $y = f^{-1}(x)$ is the inverse function of $y = f(x)$.

Write your response in the blue section for Exercise 1 on pages 3–12 of the Response Booklet. Graph paper is provided on pages 11–12 of this section.

? Help | ⊙ Navigator | Next →

Scoring Rubric for Exercise 1

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.
- 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.
- 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.
- 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.
- Significantly flawed or missing demonstration that the symbolic representation found is the inverse of the given function.

Sample Exercise 2 and Scoring Rubric

Sample Exercise 2

Exercise 2: Geometry - Candidate Name — Time Remaining 29:31

Geometry

Introduction

In this exercise, you will use your knowledge of geometry 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. You will be asked to respond to three prompts.

Criteria for Scoring

To satisfy the highest level of the scoring rubric, your responses must provide clear, consistent, and convincing evidence of the following:

- 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; and
- a logical process leading to an accurate solution of a measurement problem.

Directions

You may preview all of the prompts by clicking the **Next** button. The **Previous** button will enable you to return to any of the prompts.

You must write your responses to all prompts for this exercise in the red section for Exercise 2 on pages 13–22 of the Response Booklet. Graph paper is provided on pages 21–22 of this section. Your score for this exercise will be based only on what you write in the red section for Exercise 2 of the Response Booklet.

? Help | Navigator | Next →

Exercise 2: Geometry - Candidate Name — Time Remaining 29:31

1. This is Prompt 1 of 3. The second prompt appears on the next screen.

   Construct a proof, using any acceptable method, for the problem presented below. Include a justification of any inferences or conclusions that you make.

   In the figure below (Figure 1), $\triangle ABC$ is equilateral, *BCED* is a parallelogram, and $\angle A \cong \angle F$. Prove that $\triangle EFD$ is also equilateral.

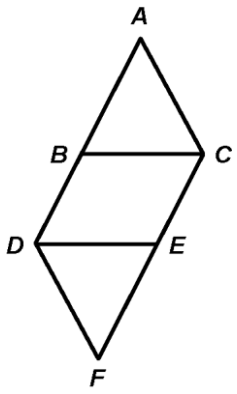


Figure 1

   Write your response in the red section for Exercise 2 on pages 13–22 of the Response Booklet. Label your response as Prompt Number 1. Graph paper is provided on pages 21–22 of this section.

? Help | Navigator | Next →

Exercise 2: Geometry - Candidate Name — Time Remaining 29:31

2. This is Prompt 2 of 3. The third prompt appears on the next screen.

   Explain the relationship between two inscribed angles with the same intercepted arc. Illustrate your response with a sketch.

   Write your response in the red section for Exercise 2 on pages 13–22 of the Response Booklet. Label your response as Prompt Number 2. Graph paper is provided on pages 21–22 of this section.

? Help | Navigator | Next →

Exercise 2: Geometry - Candidate Name | Time Remaining 29:31

3. This is Prompt 3 of 3.

   In the figure below (Figure 2), a right trapezoid has been placed on a coordinate plane with vertices (0, 0), (0, 2*a*), (*b*, *a*), and (*b*, 0).

   Write an expression, in terms of *a* and *b*, that gives the volume of the solid obtained by rotating the shaded region of the right trapezoid about the *y*-axis. Show all work.

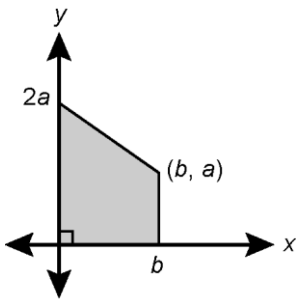


Figure 2

Write your response in the red section for Exercise 2 on pages 13–22 of the Response Booklet. Label your response as Prompt Number 3. Graph paper is provided on pages 21–22 of this section.

? Help | ⊙ Navigator | Next →

Scoring Rubric for Exercise 2

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.

Sample Exercise 3 and Scoring Rubric

Sample Exercise 3

Exercise 3: Data Analysis and Statistics - Candidate Name — Time Remaining 29:31

Data Analysis and Statistics

Introduction

In this exercise, you will use your knowledge of data analysis and statistics to analyze and graph a given set of data, interpret and model data for given statistical characteristics, and estimate probabilities. You will be asked to respond to three prompts.

Criteria for Scoring

To satisfy the highest level of the scoring rubric, your responses must provide clear, consistent, and convincing evidence of the following:

- an accurate graph and numerical analysis of a given set of data, with an accurate explanation of appropriate terms useful in statistical reasoning for describing a data set and an appropriate justification for determination of the best term to describe all the data for this given set of data;
- an accurate identification and explanation of types of association, effects on trend lines, and values of correlation coefficients; and
- an accurate graph of a normal distribution and a determination of probabilities for a given situation.

Directions

You may preview all of the prompts by clicking the **Next** button. The **Previous** button will enable you to return to any of the prompts.

You must write your responses to all prompts for this exercise in the green section for Exercise 3 on pages 23–33 of the Response Booklet. Graph paper is provided on pages 32–33 of this section. Your score for this exercise will be based only on what you write in the green section for Exercise 3 of the Response Booklet.

? Help | ⊙ Navigator | Next →

Exercise 3: Data Analysis and Statistics - Candidate Name

Time Remaining 29:31

1. This is Prompt 1 of 3. The second prompt appears on the next screen.

   Use the information below to respond to this prompt.

   The following values represent the times (in seconds) over the course of a week that Andrew logged while practicing his 100-meter sprints:

   11.25, 13.1, 12.65, 11.25, 12.0, 13.4, 13.8, 11.95, 12.1, 13.45, 11.3

   You must address each of the following in your response to this prompt.

   - Construct and label a boxplot of the data.
   - Choose the best measure of central tendency for these data and identify its value. Use statistical reasoning to explain why this measure would be the best single number description to summarize this set of data.
   - Explain under what circumstance a different measure of central tendency would be a good descriptor of data.

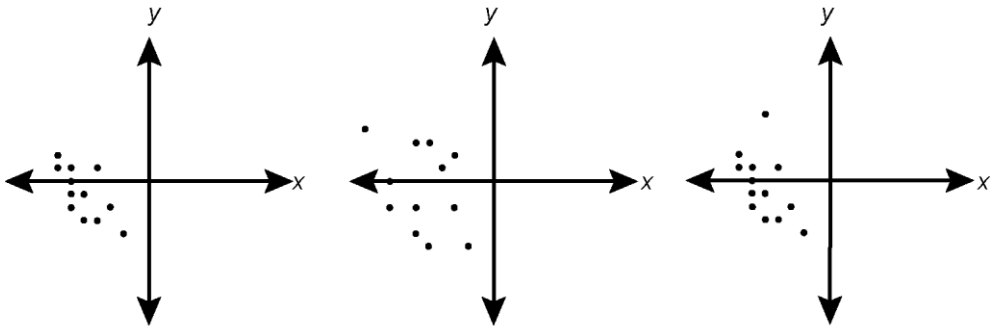
   Write your response in the green section for Exercise 3 on pages 23–33 of the Response Booklet. Label your response as Prompt Number 1. Graph paper is provided on pages 32–33 of this section.

? Help | ⊙ Navigator | Next →

Exercise 3: Data Analysis and Statistics - Candidate Name | **Time Remaining 29:31**

2. This is Prompt 2 of 3. The third prompt appears on the next screen.

   Use the graphs below to respond to this prompt. Assume the scale on each graph is the same.



Graph A **Graph B** **Graph C**

You must address each of the following in your response to this prompt.

- In Graph A, which of the three basic types of relationships between the x- and y-values (positive linear, negative linear, or no relationship) is represented? Justify your answer.
- Using your answer above, sketch a scatter plot representing one of the other types of relationships, and state the type of relationship you represented.
- Except for one point, the points on Graph C are the same as those on Graph A. How would a line of best fit on Graph C compare with a line of best fit on Graph A?
- Compare the correlation of the data in Graph A with the correlation of the data in Graph B. Give a rationale for your comparison.

Write your response in the green section for Exercise 3 on pages 23–33 of the Response Booklet. Label your response as Prompt Number 2. Graph paper is provided on pages 32–33 of this section.

? Help | ⊙ Navigator | Next →

Exercise 3: Data Analysis and Statistics - Candidate Name | Time Remaining 29:31

3. This is Prompt 3 of 3.

Use the situation and table presented below to respond to this prompt.

The number of ounces in a bag of chips is assumed to be normally distributed with a mean of 16 ounces and a standard deviation of 0.5 ounce.

Table of Standard Normal Curve Areas

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706

Note: Each table value is the cumulative area under the normal curve to the left of the specified *z*-value. Round all *z*-values in your response to 2 decimal places.

- Find the probability that a bag of chips weighs at least 16.1 ounces.
- Provide a graph of the normal curve for the situation.
- Shade the relevant region.
- Indicate the coordinate of the mean and the coordinate of any endpoint(s) of the relevant region.

Write your response in the green section for Exercise 3 on pages 23–33 of the Response Booklet. Label your response as Prompt Number 3. Graph paper is provided on pages 32–33 of this section.

? Help | ◉ Navigator | Next →

Scoring Rubric for Exercise 3

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 determine probabilities.

Characteristics:

- Accurate graph and numerical analysis of a given set of data, with an accurate explanation of appropriate terms useful in statistical reasoning for describing a data set and an appropriate justification for determination of the best term to describe all the data for this given set of data.
- Accurate identification and explanation of types of association, effects on trend lines, and values of correlation coefficients.
- Accurate graph of a normal distribution, and determination of probabilities for a given situation.

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 determine probabilities.

Characteristics:

- Mostly accurate graph and numerical analysis of a given set of data, with an explanation of appropriate terms useful in statistical reasoning for describing a data set and an appropriate justification for determination of the best term to describe all the data for this given set of data.
- Mostly accurate identification and explanation of types of association, effects on trend lines, and values of correlation coefficients.
- Mostly accurate graph of a normal distribution, and determination of probabilities for a given situation.

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 determine probabilities.

Characteristics:

- Significantly flawed graph and numerical analysis of a given set of data, with an explanation of appropriate terms useful in statistical reasoning for describing a data set and an appropriate justification for determination of the best term to describe all the data for this given set of data.
- Significantly flawed identification and explanation of types of association, effects on trend lines, and values of correlation coefficients.
- Significantly flawed graph of a normal distribution, and determination of probabilities for a given situation.

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 determine probabilities.

Characteristics:

- Mostly inaccurate or missing graph and numerical analysis of a given set of data, with no explanation of appropriate terms useful in statistical reasoning for describing a data set and an appropriate justification for determination of the best term to describe all the data for this given set of data.
- Mostly inaccurate or missing identification and explanation of types of association, effects on trend lines, and values of correlation coefficients.
- Mostly inaccurate or missing graph of a normal distribution, and determination of probabilities for a given situation.

Produced for

NATIONAL BOARD
for Professional Teaching Standards®

by

PEARSON

The National Board for Professional Teaching Standards, Inc. has been funded in part with grants from the U.S. Department of Education and the National Science Foundation. The contents of this publication do not necessarily represent the policy of the U.S. Department of Education or the National Science Foundation, and you should not assume endorsement by the Federal Government. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the sponsors.

Prepared by Pearson for submission under contract with the National Board for Professional Teaching Standards®.