

NBCT MATHEMATICS ADOLESCENCE AND YOUNG ADULthood (AYA) COMPONENT 1 PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

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1. What are the domain and range of $f(x) = \sqrt{x - 2}$?
- A. Domain $x \geq 2$; Range $y \geq 0$.
 - B. Domain $x > 2$; Range $y > 0$.
 - C. Domain $x \geq 0$; Range $y \geq 0$.
 - D. Domain $x \leq 2$; Range $y \leq 0$.
2. One pint equals how many cups?
- A. 3 cups
 - B. 2 cups
 - C. 4 cups
 - D. 1 cup
3. Cosine function touches the x-axis at which x-values?
- A. 0 and 2π
 - B. π and 2π
 - C. 0 and π
 - D. $\pi/2$ and $3\pi/2$
4. What is the probability of rolling a sum of 7 with two fair six-sided dice?
- A. $1/8$
 - B. $1/9$
 - C. $1/6$
 - D. $1/12$
5. A trapezoid is which of the following?
- A. A quadrilateral
 - B. A triangle
 - C. A pentagon
 - D. A circle
6. Quipu were used by which civilization to record numbers on knotted strings?
- A. Maya
 - B. Inca
 - C. Greece
 - D. Mesopotamia

7. What is the period of the tangent function $y = \tan x$?
- A. π
 - B. 2π
 - C. $\pi/2$
 - D. 3π
8. A monotone function is always
- A. The function is always increasing or always decreasing
 - B. The function is constant
 - C. The function is periodic
 - D. The function is sometimes increasing and sometimes decreasing
9. The midline in a trigonometric graph is best described as which of the following?
- A. Vertical shift (up or down)
 - B. Horizontal shift (left or right)
 - C. Amplitude
 - D. Period
10. Which statement explains why the interior-angle sum of an n -sided polygon is $(n-2) \times 180$ degrees?
- A. Sum of exterior angles equals 360 degrees.
 - B. Partition into $(n-2)$ triangles.
 - C. All interior angles are equal.
 - D. The sum is independent of the number of sides.

Answers

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1. B
2. B
3. D
4. C
5. A
6. B
7. A
8. A
9. A
10. B

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Explanations

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1. What are the domain and range of $f(x) = \sqrt{x - 2}$?

- A. Domain $x \geq 2$; Range $y \geq 0$.
- B. Domain $x > 2$; Range $y > 0$.**
- C. Domain $x \geq 0$; Range $y \geq 0$.
- D. Domain $x \leq 2$; Range $y \leq 0$.

The main idea is that a square root requires the inside quantity to be nonnegative, and the result is always nonnegative as well. For $f(x) = \sqrt{x - 2}$, the inside is $x - 2$, so we need $x - 2 \geq 0$, which means $x \geq 2$. When $x = 2$, $f(x) = \sqrt{0} = 0$, so 0 is included in the range. As x grows, $x - 2$ grows and the square root grows as well, giving all nonnegative values. So the domain is all x with $x \geq 2$, and the range is all y with $y \geq 0$. The choice that would exclude $x = 2$ or require the output to be negative isn't correct, and the one that starts above 0 would miss the value at $x = 2$.

2. One pint equals how many cups?

- A. 3 cups
- B. 2 cups**
- C. 4 cups
- D. 1 cup

In U.S. customary measurements, a pint is twice as big as a cup. A cup holds 8 fluid ounces and a pint holds 16, and $16 \div 8 = 2$, so one pint equals two cups. If you have three cups, that's 1.5 pints; four cups is 2 pints; one cup is half a pint. The only amount that matches a pint is two cups.

3. Cosine function touches the x-axis at which x-values?

- A. 0 and 2π
- B. π and 2π
- C. 0 and π
- D. $\pi/2$ and $3\pi/2$**

The value where the cosine function crosses the x-axis is where $\cos x = 0$. In one full cycle from 0 to 2π , those x-values are $\pi/2$ and $3\pi/2$. At these angles the point on the unit circle lies on the y-axis, so the x-coordinate (which is $\cos x$) is zero. The other numbers don't give zero because $\cos 0 = 1$, $\cos \pi = -1$, and $\cos 2\pi = 1$. Since cosine repeats every 2π , the zeros occur again at $\pi/2 + k\pi$ for any integer k .

4. What is the probability of rolling a sum of 7 with two fair six-sided dice?

- A. $1/8$
- B. $1/9$
- C. $1/6$**
- D. $1/12$

Count the outcomes and use probability as favorable outcomes divided by total outcomes. When rolling two fair six-sided dice, there are $6 \times 6 = 36$ equally likely ordered outcomes. The combinations that sum to 7 are: (1,6), (2,5), (3,4), (4,3), (5,2), and (6,1) – six favorable cases. So the probability is 6 out of 36, which simplifies to $1/6$. This matches the intuitive idea that there are six ways to reach 7, out of 36 equally likely possibilities. The other fractions would require a different number of favorable outcomes (for example, four or three), which doesn't align with the actual six ways to make 7.

5. A trapezoid is which of the following?

- A. A quadrilateral**
- B. A triangle
- C. A pentagon
- D. A circle

A trapezoid is a four sided polygon, which means it is a quadrilateral. That makes it fit the definition of a quadrilateral, since it has exactly four sides. The other options describe shapes with a different number of sides: three for a triangle, five for a pentagon, and a circle has no sides at all. So the best description is that a trapezoid is a quadrilateral. If you've learned that a trapezoid typically has a pair of parallel sides, that property sits inside the broader idea that it's a four sided figure.

6. Quipu were used by which civilization to record numbers on knotted strings?

- A. Maya
- B. Inca**
- C. Greece
- D. Mesopotamia

Quipu are a counting system made from knotted cords used to record numbers and other data. The Inca relied on these knotted strings to manage taxes, censuses, goods, and labor across their empire. Numbers were encoded by the type and placement of knots on the cords, with decimal values indicated by how the knots were arranged along the main cord and on pendant cords, and by colors or groups of cords used to categorize information. This method of record-keeping is specific to the Inca, while the Maya developed a system of glyphs, and Greece and Mesopotamia used writing systems like alphabets or cuneiform rather than knotted cords. So, the civilization that used quipu to record numbers on knotted strings is the Inca.

7. What is the period of the tangent function $y = \tan x$?

- A. π
- B. 2π
- C. $\pi/2$
- D. 3π

The basic idea is what number P makes $\tan(x+P)$ equal to $\tan(x)$ for all x where the function is defined. For tangent, $\tan(x+\pi)$ equals $\tan x$ because $\tan(x) = \sin x / \cos x$ and using angle addition, $\sin(x+\pi) = -\sin x$ and $\cos(x+\pi) = -\cos x$, so $\tan(x+\pi) = (-\sin x)/(-\cos x) = \tan x$. That shows the function repeats every π units. The graph also has vertical asymptotes at $x = \pi/2 + k\pi$, so the distance between repeats is π , reinforcing the fundamental period. Therefore, the period is π .

8. A monotone function is always

- A. The function is always increasing or always decreasing
- B. The function is constant
- C. The function is periodic
- D. The function is sometimes increasing and sometimes decreasing

A monotone function keeps the same direction of change across its entire domain: as x increases, the function values never switch from increasing to decreasing (or vice versa). In other words, it either never goes down (nondecreasing) or never goes up (nonincreasing) as you move along x . That means the function is always moving in one direction: increasing (or staying flat) or decreasing (or staying flat) throughout its domain. That's why the statement that it is always increasing or always decreasing is the best description. A constant function is a special case that fits monotonicity, but not every monotone function is strictly increasing or strictly decreasing. A function that is periodic would have to repeat values in cycles, which conflicts with the idea of not reversing direction. And a function that is sometimes increasing and sometimes decreasing would violate monotonicity by changing direction.

9. The midline in a trigonometric graph is best described as which of the following?

- A. Vertical shift (up or down)
- B. Horizontal shift (left or right)
- C. Amplitude
- D. Period

The midline is the horizontal line around which a sine or cosine wave oscillates; it represents the average value of the function over a full cycle. In the standard form $y = A \sin(Bx - C) + D$ (or with cosine), the midline is $y = D$, which is a vertical shift up or down by D . This moves the entire graph up or down without changing its height relative to the midline. The amplitude is the distance from the midline to a peak, not the midline itself, and the period depends on B , reflecting horizontal stretching or compression. For example, $y = 3 \sin(2x) + 1$ has a midline at $y = 1$, oscillates between -2 and 4 , with amplitude 3 and period π .

10. Which statement explains why the interior-angle sum of an n -sided polygon is $(n-2) \times 180$ degrees?

A. Sum of exterior angles equals 360 degrees.

B. Partition into $(n-2)$ triangles.

C. All interior angles are equal.

D. The sum is independent of the number of sides.

Partitioning the polygon into triangles explains the interior-angle sum. If you draw diagonals from a single vertex to all other nonadjacent vertices, you divide the n -sided polygon into exactly $n-2$ triangles. Each triangle has interior angles totaling 180 degrees, so the whole polygon's interior angles add up to $180 \times (n-2)$ degrees. This matches the formula $(n-2) \times 180$. This also aligns with simple checks: a triangle sums to 180 degrees, a quadrilateral to 360, a pentagon to 540, and so on. The exterior-angle sum being 360 is related but doesn't directly justify the interior sum. Saying all interior angles are equal would apply only to regular polygons, not to the general case. And claiming the sum is independent of the number of sides is false because the total increases with n .

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

<https://nbctmathayacomponent1.examzify.com>

We wish you the very best on your exam journey. You've got this!

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