TExES Mathematics 4-8 (115) Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

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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

1. What is the formula for the circumference of a circle?

A. $C = \pi d$

B. $C = 2\pi r$

C. $C = \pi r^2$

D. $C = 2r$

2. How do you calculate the circumference of a circle?

A. 2(pi)radius

B. pi x diameter

C. pi x r^2

D. radius + pi

3. What characterizes a parallelogram?

A. One pair of parallel sides

B. No parallel sides

C. Two pairs of parallel sides

D. All sides are equal

4. What is the volume of a cube with a side length of 4?

A. 48

B. 56

C. 64

D. 72

5. If a number is increased by 20% and the result is 60, what was the original number?

A. 40

B. 50

C. 60

D. 70

6. What does a reflection across the x or y axis result in?

A. A slide across the graph

B. A flip of the figure

C. A rotation around a point

D. A change in size

7. Which of the following is a characteristic of a function?

A. All outputs can be produced by multiple inputs.

B. Each input corresponds to at least one output.

C. The graph must be a straight line.

D. Intervals of the function may not have outputs.

8. According to the distributive property, how can you simplify the expression a(b + c)?

A. a + b + c

B. ab + ac

C. ab + c

D. a + bc

9. What is the distance formula in a coordinate plane?

A. $d = \sqrt{(x2 - x1)^2 + (y2 - y1)^2}$

B. $d = (x2 - x1) + (y2 - y1)$

C. $d = |x2 - x1| + |y2 - y1|$

D. $d = x2 + y2$

10. What is the situation when the discriminant is a positive perfect square?

A. Two real rational roots

B. One real irrational root

C. Two complex roots

D. One real rational root

Answers

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

Explanations

1. What is the formula for the circumference of a circle?

A. C = πd

B. C = 2πr

C. C = πr²

D. C = 2r

The formula for the circumference of a circle can be derived from the relationship between the diameter and the radius of the circle. The circumference, which is the distance around the circle, is calculated by the formula C = 2πr, where r represents the radius. In this formula, the factor of 2 accounts for the fact that the diameter (which is twice the radius) is being used in the calculation. Thus, the circumference can also be expressed in terms of the diameter as C = πd, since the diameter (d) is equal to 2r, making both forms of the formula valid. However, when specifically asking for the circumference based on the radius, C = 2πr is the most direct and commonly used representation. The other choices listed do not represent the correct formula for circumference. For instance, C = πr² is the formula for the area of a circle, and C = 2r does not include the scale factor of π that is essential for calculating circumference. This is why C = 2πr is the correct and widely accepted formula for determining the circumference of a circle.

2. How do you calculate the circumference of a circle?

A. 2(pi)radius

B. pi x diameter

C. pi x r^2

D. radius + pi

The calculation of the circumference of a circle is based on the relationship between the radius or diameter of the circle and the mathematical constant pi (π). The correct formula for calculating circumference can be expressed in two ways depending on whether you use the radius or the diameter. Using the radius, the circumference is calculated by multiplying 2 by π and by the radius (2πr). This is because the radius is half of the diameter, and when you double the radius, you essentially calculate the perimeter of the circle based on its circular nature. Alternatively, if you are using the diameter, the circumference can also be calculated by multiplying π by the diameter (πd), since the diameter is twice the radius. As to the other options, while π times the diameter is also a correct method to find circumference, the option that directly uses the radius in the form of 2πr is specifically suitable for situations where the radius is known, which solidifies its correctness in the context of this question. The formula πr², on the other hand, is used to calculate the area of a circle, not its circumference. The expression "radius + π" does not relate to the concept of circumference at all, making it irrelevant in this context. Thus

3. What characterizes a parallelogram?

A. One pair of parallel sides

B. No parallel sides

C. Two pairs of parallel sides

D. All sides are equal

A parallelogram is characterized by having two pairs of opposite sides that are both parallel and equal in length. This defining property establishes that each pair of opposite sides runs in the same direction and maintains a consistent distance apart, which is the essence of parallelism. Furthermore, vectors representing these sides can be seen as equal in magnitude and direction, contributing to the shape's overall stability and symmetry. This property of having two pairs of parallel sides is what distinguishes parallelograms from other quadrilateral shapes, such as triangles or trapezoids. Consequently, the emphasis on parallelism in both pairs of sides is fundamental to the classification of a parallelogram, making it a vital concept in geometry that is applicable in various mathematical situations, including calculating area, understanding symmetry, and exploring transformations.

4. What is the volume of a cube with a side length of 4?

A. 48

B. 56

C. 64

D. 72

To find the volume of a cube, the formula used is \(V = s^3 \), where \(s \) represents the length of a side of the cube. In this case, the side length is given as 4. Calculating the volume involves raising the side length to the third power: \[V = 4^3 = 4 \times 4 \times 4 \] First, multiply the first two fours: \[4 \times 4 = 16 \] Next, multiply the result by the third four: \[16 \times 4 = 64 \] Thus, the volume of the cube is 64 cubic units. This demonstrates the use of the cube volume formula and confirms that the correct answer aligns with the calculated value.

5. If a number is increased by 20% and the result is 60, what was the original number?

A. 40

B. 50

C. 60

D. 70

To determine the original number when it is increased by 20% and the resulting value is 60, we can set up an equation based on the relationship between the original number and the increased value. Let the original number be represented as \(x \). An increase of 20% means that we multiply the original number by 1.20 (which represents the original amount plus the 20% increase). Thus, we can express this mathematically as: \[1.20x = 60 \] To find the original number \(x \), we need to isolate it by dividing both sides of the equation by 1.20: \[x = \frac{60}{1.20} \] Calculating the right side gives: \[x = 50 \] This shows that the original number is indeed 50. The process involves understanding that increasing a number by a percentage requires you to find 120% of the original number (which incorporates both the original amount and the 20% increase), leading to the equation that allows you to solve for the original value.

6. What does a reflection across the x or y axis result in?

A. A slide across the graph

B. A flip of the figure

C. A rotation around a point

D. A change in size

When a figure reflects across the x-axis or y-axis, it effectively "flips" the figure over that axis. For example, reflecting a point located at (x, y) across the x-axis results in the point (x, -y), while reflecting it across the y-axis gives (−x, y). This transformation preserves the shape and size of the figure but alters its position, effectively causing it to visually flip or mirror over the designated axis. This phenomenon can be visualized by considering how the vertical or horizontal line acts as a mirror. The points that are on one side of the axis are moved to the opposite side but at the same distance from it, maintaining the integrity and proportions of the original figure. Thus, it is accurately described as a flip. The other transformations mentioned, such as a slide (translation), rotation around a point, or change in size (dilation), do not accurately characterize the nature of a reflection. Each of those involves different types of movements or alterations to the original figure, but a reflection specifically results in a reversal over the axis.

7. Which of the following is a characteristic of a function?

A. All outputs can be produced by multiple inputs.

B. Each input corresponds to at least one output.

C. The graph must be a straight line.

D. Intervals of the function may not have outputs.

A key characteristic of a function is that each input corresponds to exactly one output. This means that if you take any value from the domain (input), there will be a specific value in the range (output) associated with it. This relationship is crucial because it ensures that each element in the domain pairs with a unique element in the range, which is foundational to the definition of a function. The idea that each input corresponds to at least one output highlights that functions can take an input and produce a direct output, even if the output is not unique. However, it is important to note that while some inputs can provide the same output—indicating that multiple inputs can indeed lead to the same output in a function—each individual input still cannot pair with more than one output. Therefore, recognizing that each input must have a corresponding output solidifies the understanding of functions in algebra and higher mathematics, which is essential for problem-solving and graphical representation of functions.

8. According to the distributive property, how can you simplify the expression a(b + c)?

A. a + b + c

B. ab + ac

C. ab + c

D. a + bc

The distributive property states that when you have an expression of the form a(b + c), you can distribute the a to each term inside the parentheses. This means that you multiply a by each of the terms b and c separately. When applying this property to the expression a(b + c), you first multiply a by b, which gives you ab. Then, you multiply a by c, resulting in ac. When you combine these two results together, the simplified expression becomes ab + ac. This systematic approach to distributing allows for the proper simplification of the expression and aligns with the fundamental principles of algebra. Thus, the correct choice that reflects this application of the distributive property is ab + ac.

9. What is the distance formula in a coordinate plane?

A. $d = \sqrt{((x2 - x1)^2 + (y2 - y1)^2)}$

B. d = (x2 - x1) + (y2 - y1)

C. d = |x2 - x1| + |y2 - y1|

D. d = x2 + y2

The distance formula in a coordinate plane is derived from the Pythagorean theorem, which relates the lengths of the sides of a right triangle to the length of the hypotenuse. When finding the distance between two points \((x_1, y_1)\) and \((x_2, y_2)\), you form a right triangle where the legs are the differences in the x-coordinates and y-coordinates: \((x_2 - x_1)\) and \((y_2 - y_1)\). By applying the Pythagorean theorem, the distance \(d\) (which represents the length of the hypotenuse) can be calculated using the formula: \[d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \] This correctly captures how the coordinate changes in both dimensions combine to give the straight-line distance between two points on a plane. The square root is necessary because it allows us to return to the positive length from the squares of the differences. The other options do not accurately reflect this relationship. The addition and absolute value approaches do not take into account the need for squaring the differences to

10. What is the situation when the discriminant is a positive perfect square?

A. Two real rational roots

B. One real irrational root

C. Two complex roots

D. One real rational root

When the discriminant of a quadratic equation is a positive perfect square, it indicates the nature of the roots of the equation. The discriminant, given by the formula \(b^2 - 4ac\), provides insight into the types of solutions: 1. A positive discriminant means that there are two distinct real roots. 2. If this positive discriminant is also a perfect square, it suggests that these roots can be expressed as rational numbers. This is because the square root of a perfect square is an integer; thus, it does not introduce any irrational components in the solutions. For instance, consider the quadratic equation formed by the discriminant \(9\) (which is \(3^2\)). The roots derived from this would take the form of rational numbers, as \(\frac{-b \pm \sqrt{9}}{2a}\) results in rational outcomes. This leads to the conclusion that when the discriminant is a positive perfect square, the quadratic equation will yield two real rational roots.

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://texesmath4to8.examzify.com

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