Praxis Mathematics (5165) Practice Test (Sample)

Study Guide

BY EXAMZIFY

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. A double inequality example is $-c < ax + b < c$. This form is best described as

   A. $-c < ax + b < c$

   B. $ax + b < -c$ or $ax + b > c$

   C. $ax + b > -c$ and $ax + b < c$

   D. $ax + b \leq c$ and $ax + b \geq -c$

2. Which best describes manipulation of functions?

   A. Altering a function's equation or graph through transformations or algebraic manipulations

   B. Only adding constants

   C. Only multiplying by scalars

   D. Changing the function's domain only

3. If a linear function is defined for all real numbers, what is its domain?

   A. All real numbers.

   B. Only nonnegative numbers.

   C. All positive numbers.

   D. A finite interval.

4. Which statement best defines the common factor?

   A. A factor of all numbers combined

   B. A factor of two or more given numbers

   C. The largest multiple of two numbers

   D. The sum of the numbers' factors

5. If $-2x < 6$, after dividing by -2, which inequality is correct?

   A. $x > -3$

   B. $x < -3$

   C. $x \geq -3$

   D. $x \leq -3$

6. Which statement about real numbers is true?

A. Real numbers include both rational and irrational numbers.

B. Real numbers include only integers.

C. Real numbers include only fractions.

D. Real numbers exclude negative numbers.

7. Which statement describes an improper fraction according to the given definition?

A. Numerator less than denominator

B. Numerator greater than denominator

C. Denominator greater than numerator

D. Numerator equals denominator

8. A rational expression is defined as?

A. A fraction where numerator and denominator are polynomials; the denominator cannot be zero.

B. A difference of two monomials.

C. A product of a polynomial and a constant.

D. A polynomial divided by a constant.

9. If a number can be expressed as a ratio of two integers with a nonzero denominator, it is called a...

A. rational number

B. irrational number

C. real number

D. composite number

10. In a direct proportion, as one quantity increases, the other:

A. Increases by a fixed amount for every increase in the other quantity and the ratio stays constant.

B. Increases by a fixed amount for every decrease in the other quantity and the ratio changes.

C. Increases by a variable amount for every increase in the other quantity.

D. Decreases by a fixed amount while the ratio stays constant.

Answers

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

Explanations

1. A double inequality example is -c < ax + b < c. This form is best described as

A. -c < ax + b < c

B. ax + b < -c or ax + b > c

C. ax + b > -c and ax + b < c

D. ax + b ≤ c and ax + b ≥ -c

The question tests understanding of a chain (double) inequality, which describes a value lying between two bounds in a single, concise statement. -c < ax + b < c means ax + b is strictly greater than -c and strictly less than c at the same time. The two strict inequalities together enforce that ax + b sits inside the interval (-c, c), with the endpoints excluded. Why this form is best: expressing the idea as a single chained statement clearly communicates the “between” relationship in one compact expression. It shows the simultaneous requirement of both bounds without breaking the idea into separate pieces. If you rewrite it as two separate inequalities joined by "and" (ax + b > -c and ax + b < c), you describe the same set of values, but the chain form is the standard, most direct way to express a value between two numbers. Note: using or would describe values outside the interval, and using non-strict signs (≤ or ≥) would include the endpoints, which isn’t the same as the given strict between.

2. Which best describes manipulation of functions?

A. Altering a function's equation or graph through transformations or algebraic manipulations

B. Only adding constants

C. Only multiplying by scalars

D. Changing the function's domain only

Manipulation of functions means changing a function in a way that gives another function, either by altering its defining equation or by adjusting its graph. This includes transformations such as shifts, stretches, and reflections, as well as algebraic changes to the expression that defines the function—like composing with another function, simplifying, or solving for a variable. So the idea is broad: you’re modifying the function itself through both changes to its formula and changes to its graph. This is why the description that mentions altering the function’s equation or graph through transformations or algebraic manipulations is the best fit. It covers shifts, scales, reflections, and other edits to the formula, not just a single type of change. Simply adding constants, or only multiplying by scalars, are narrower cases that don’t encompass all the ways a function can be manipulated. Changing the domain alone focuses on where the function is defined rather than how the function itself is transformed or expressed.

3. If a linear function is defined for all real numbers, what is its domain?

A. All real numbers.

B. Only nonnegative numbers.

C. All positive numbers.

D. A finite interval.

Domain refers to the set of input values x for which the function is defined. For a linear function with real coefficients, there are no restrictions on x, so you can substitute any real number and get a real output. That means the domain is all real numbers. Visually, a straight line stretches without end in both directions, reflecting inputs from every real number. The other options would require limiting the inputs (to nonnegative, positive, or a finite interval), which isn't the case here.

4. Which statement best defines the common factor?

A. A factor of all numbers combined

B. A factor of two or more given numbers

C. The largest multiple of two numbers

D. The sum of the numbers' factors

A common factor is a number that divides each number in the given set evenly. For two or more numbers, a common factor is a divisor that appears in the factor lists of all of them. That's why the best description is "a factor of two or more given numbers"—it means the number divides every one of the numbers under consideration. For example, with 8 and 12, the common factors are 1, 2, and 4, since each divides both numbers. The other statements stray from this idea: a factor of all numbers combined could mean something like a divisor of a sum or product, which isn't the definition; a largest multiple isn't about divisors; and the sum of the numbers' factors isn't about divisibility at all.

5. If $-2x < 6$, after dividing by -2, which inequality is correct?

A. $x > -3$

B. $x < -3$

C. $x \geq -3$

D. $x \leq -3$

Dividing by a negative number reverses the inequality sign. Starting with $-2x < 6$, divide both sides by -2 to get $x > -3$. The left side simplifies to x and the right side to -3, and since the original inequality is strict, -3 is not included. A quick check: if $x = -2$ (which is greater than -3), then $-2x = 4$ and $4 < 6$ holds; if $x = -4$ (not greater than -3), $-2x = 8$ and $8 < 6$ fails. So the solution is $x > -3$.

6. Which statement about real numbers is true?

A. Real numbers include both rational and irrational numbers.

B. Real numbers include only integers.

C. Real numbers include only fractions.

D. Real numbers exclude negative numbers.

The real numbers are all the points you can place on the number line, including every rational and irrational number. Rational numbers are fractions of integers, which includes integers themselves like -3, 0, and 5, as well as fractions such as 1/2 or -7/4. Irrational numbers cannot be written as a ratio of integers, and their decimal expansions never terminate or repeat, examples being sqrt(2) and pi. Real numbers also include negative values, zero, and positives. Because real numbers contain both rational and irrational numbers and extend in both directions along the number line, the statement is true. The other descriptions—being limited to only integers, only fractions, or excluding negatives—don't fit the full set of real numbers.

7. Which statement describes an improper fraction according to the given definition?

A. Numerator less than denominator

B. Numerator greater than denominator

C. Denominator greater than numerator

D. Numerator equals denominator

An improper fraction is a fraction where the numerator is larger than the denominator, so its value is at least 1. That's why the statement describing an improper fraction is the one where the top number is bigger than the bottom number. For example, 7/3 or 9/4 are improper because the numerator exceeds the denominator. In contrast, a fraction with the numerator smaller than the denominator is a proper fraction, and a fraction with equal numerator and denominator equals 1; under this definition, that last case isn't described as improper.

8. A rational expression is defined as?

A. A fraction where numerator and denominator are polynomials; the denominator cannot be zero.

B. A difference of two monomials.

C. A product of a polynomial and a constant.

D. A polynomial divided by a constant.

A rational expression is a ratio of two polynomials in the variable, with the denominator not equal to zero. This means you can write it as P(x) over Q(x), where P and Q are polynomials and Q(x) ≠ 0 for all x in the domain. That's exactly what the option says: a fraction whose numerator and denominator are polynomials, and the denominator cannot be zero. The other descriptions don't capture the idea of a ratio of polynomials in the variable: a difference of monomials isn't a fraction; a product of a polynomial and a constant is just a polynomial; and a polynomial divided by a constant is a special, simpler case that doesn't emphasize the general form of a rational expression.

9. If a number can be expressed as a ratio of two integers with a nonzero denominator, it is called a...

A. rational number

B. irrational number

C. real number

D. composite number

A number that can be written as a fraction of two integers with a nonzero denominator is called a rational number. This means you can find integers a and b (with b not equal to zero) such that the number equals a/b. Examples include 3/4, -5/2, and 0 (which can be written as 0/7). The idea is that the ratio of whole numbers captures exactly the rational numbers. Numbers like sqrt(2) or pi cannot be expressed as such a ratio, so they are irrational. The term real number covers both rational and irrational numbers, but the fraction form specifically identifies the rationals. A composite number, meanwhile, is just a kind of integer with more than two positive factors, which is unrelated to whether a number can be written as a fraction of integers.

10. In a direct proportion, as one quantity increases, the other:

A. Increases by a fixed amount for every increase in the other quantity and the ratio stays constant.

B. Increases by a fixed amount for every decrease in the other quantity and the ratio changes.

C. Increases by a variable amount for every increase in the other quantity.

D. Decreases by a fixed amount while the ratio stays constant.

Direct proportionality means the two quantities scale together with a constant ratio. If one quantity changes, the other changes by a fixed multiple of that change, so their ratio stays the same. In symbols, $y = kx$, so when x increases by Δx, y increases by $\Delta y = k\Delta x$. This keeps y/x equal to k for any values, so the other quantity grows in step with the first. That's why the statement that the other quantity increases and the ratio remains constant is the correct description. The idea that the increase would be a fixed absolute amount unrelated to the size of the change, or that the increase could vary with x, or that one must decrease, does not fit direct proportionality.

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://praxis5165.examzify.com

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