

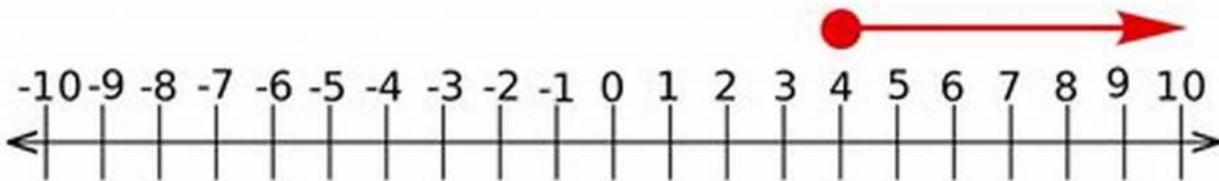
# Unveiling the Secrets Behind Algebraic Inequalities Problem In Mathematics 2021

## Solving Inequalities

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$$x \geq 4$$

the closed circle means 4 is **included** in the solution set

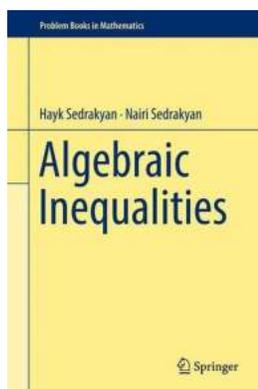


Algebraic inequalities are an essential part of mathematics, often appearing in various fields such as calculus, optimization, and even probability theory. They provide us with powerful tools to compare and manipulate mathematical expressions, helping us solve complex problems and prove mathematical statements.

### What are Algebraic Inequalities?

An algebraic inequality is a mathematical statement that compares two algebraic expressions using inequality symbols such as " $>$ ", " $<$ ", " $\geq$ ", or " $\leq$ ". These symbols

represent "less than", "greater than", "less than or equal", "greater than or equal", and "not equal" respectively.



## Algebraic Inequalities (Problem Books in

**Mathematics)** by A. Zee (1st ed. 2018 Edition, Kindle Edition)

★★★★★ 5 out of 5

Language	: English
Paperback	: 384 pages
Item Weight	: 1.23 pounds
Dimensions	: 6.1 x 0.7 x 9.2 inches
File size	: 4854 KB
Screen Reader	: Supported
Print length	: 256 pages
X-Ray for textbooks	: Enabled
Hardcover	: 334 pages



## Types of Algebraic Inequalities

There are various types of algebraic inequalities, each with its own characteristics and methods of solving. Some common types include:

- **Linear Inequalities:** These are inequalities involving linear expressions, such as  $ax + b > c$ , where  $a$ ,  $b$ , and  $c$  are constants and  $x$  is the variable.
- **Quadratic Inequalities:** Inequalities involving quadratic expressions, like  $ax^2 + bx + c > 0$ , where  $a$ ,  $b$ , and  $c$  are constants and  $x$  is the variable.
- **Rational Inequalities:** These involve rational expressions, which are ratios of polynomial expressions. Examples include  $(x + 1)/(x - 2) > 0$ .
- **Exponential and Logarithmic Inequalities:** These include expressions with exponential and logarithmic functions, such as  $e^x > 10$  or  $\log(x + 1)$

## **Solving Algebraic Inequalities**

To solve algebraic inequalities, we employ various methods based on the type of inequality. Here are some general techniques:

### **Graphical Method**

The graphical method involves plotting the graphs of both sides of the inequality on a Cartesian plane and examining their intersection points or regions. This method provides a visual representation of the solution set.

### **Sign Analysis Method**

The sign analysis method involves determining the sign of each expression involved in the inequality for different intervals of the variable. This approach helps us identify the intervals that satisfy the inequality.

### **Algebraic Manipulation Method**

Algebraic manipulation includes techniques such as factoring, completing the square, and applying transformations to simplify the inequality and determine its solutions.

## **Use Cases in Mathematics**

Algebraic inequalities find applications in various areas of mathematics, including:

- **Calculus:** Inequalities are crucial for locating critical points, finding intervals of increase or decrease, and determining concavity in functions.
- **Optimization:** Inequalities help in determining maximum or minimum values of functions subject to given constraints.
- **Probability Theory:** Inequalities play a significant role in proving inequalities like the Markov's inequality or the Chebyshev's inequality.

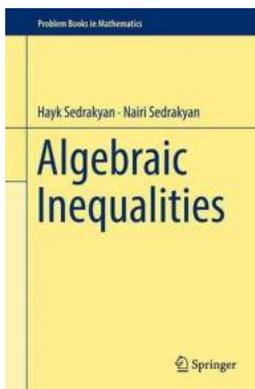


Solve the inequality

$$- 2 < \frac{3x}{5} < 7$$

Quick reminder videos

Algebraic inequalities are a powerful tool in mathematics and have a broad range of applications. Understanding various types of algebraic inequalities and the methods to solve them is crucial for tackling complex mathematical problems across multiple fields. So, dive into the world of algebraic inequalities, explore their applications, and strengthen your mathematical skills!



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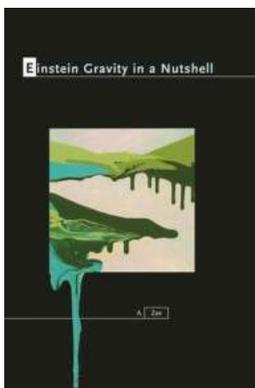
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This book can serve teachers, high-school students, and mathematical competitors. It may also be used as supplemental reading, providing readers with new and classical methods for proving algebraic inequalities.



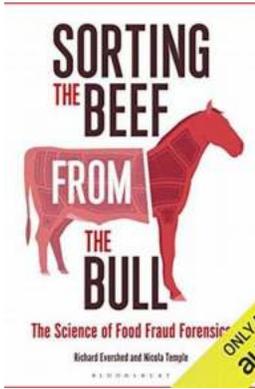
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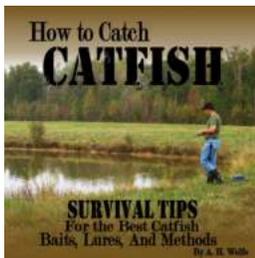
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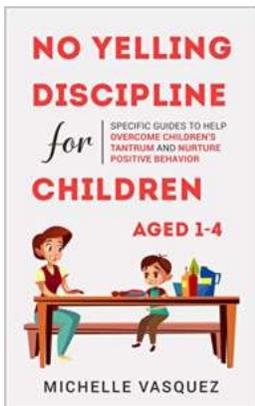
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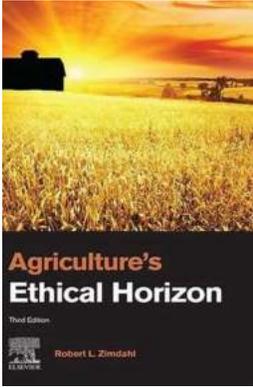
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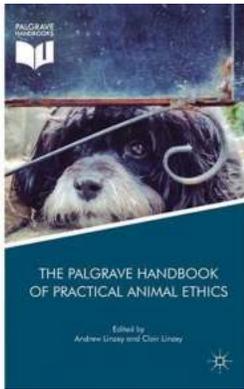
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