# Teaching Mathematical Inequalities Virtually using Nearpod

Demonstration Webinar



**Activity Book**

Institute for the Professional Development of Adult Educators

WEBINAR ACTIVITY BOOK

# Teaching Mathematical Inequalities Virtually using Nearpod

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| 27 | List the steps to graphing mathematical inequalities. | |

# High Impact Indicators - Algebraic Reasoning

| Algebraic Reasoning | | |
|---|---|---|
| **Assessment Target** | **Indicators** | **What to look for in student work: The student can** |
| **A.3** Write, manipulate, solve, and graph linear inequalities | **A.3.a** Solve linear inequalities in one variable with rational number coefficients.<br><br>**A.3.b** Identify or graph the solution to a one variable linear inequality on a number line.<br><br>**A.3.c** Solve real-world problems involving inequalities.<br><br>**A.3.d** Write linear inequalities in one variable to represent context. | • Solve inequalities in one variable, using the standard algorithms.<br>• Solve a one-variable inequality and identified or created a graph on the number line of the solution.<br>• Analyze the relationship between quantities in a real-world problem, and then create an inequality to model the problem situation.<br>• Analyze the relationship between quantities in a real-world problem, and then solve the problem through algebraic reasoning. |

# Symbols and Vocabulary for Inequalities

| Notation or Vocabulary | Definition |
|---|---|
| $a > b$ | a is more than b |
| $a \geq b$ | a is at least b |
| $a < b$ | a is less than b |
| $a \leq b$ | a is at most b or a is no more than b |
| $a \neq b$ | a is not equal to b |
| $\infty$ | Symbol for positive infinity - an abstract concept describing something without any bound or larger than any number. |
| Boundary point | A solution that makes the inequality true |
| Coefficient | 4a > b - the number associated with the variable |
| Inclusive | a :5 6 - includes the number and is indicated on the number line with a closed circle  |
| Exclusive | A < 6 - excludes the number and is indicated on the number line with an open circle  |
| Solution Set | The range of values that make the inequality true |

# Inequality Key Words and Symbols

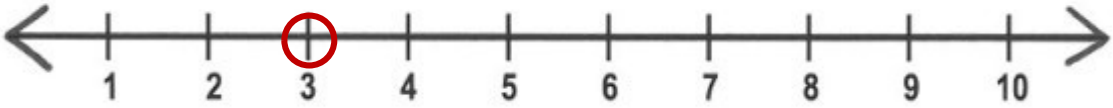
| Symbol Æ | Meaning | Associated Words |
|---|---|---|
| ≥ | Greater than or equal to | • No less than<br>• At least<br>• Minimum |
| ≤ | Less than or equal to | • No more than<br>• At most<br>• Maximum |
| > | Greater than | • More than<br>• Greater than |
| < | Less than | • Less than<br>• Fewer than |
| = | Equal to/Equals | • The same as<br>• Is equal to<br>• equals |

## Vocabulary

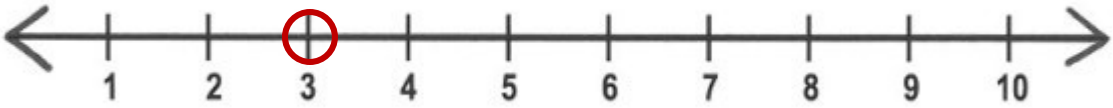
| | |
|---|---|
| Inequality | A mathematical statement formed by placing an inequality symbol between two expressions. |
| Less Than | Smaller in size, quantity, or amount; the symbol < stands for is less than. |
| Greater Than | More than in size, quantity, or amount; the symbol > stands for is greater than. > |
| Less Than or Equal To | When the inequality is same or smaller. |
| Greater Than or Equal To | When the inequality is same or bigger. |
| Solution of an inequality | The set of all numbers that produce true statements when substituted for the variable in the inequality. |
| Verbal Sentence | A Verbal Sentence is a sentence containing clues about an equation/inequality within the problem. Or the equation/inequality in sentence. |

## Steps to Graphing Inequalities

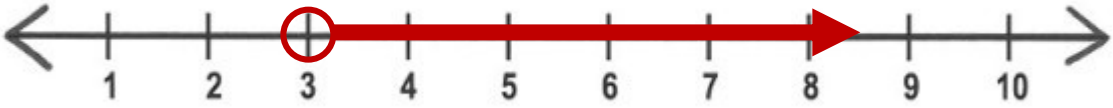
**Step 1** To plot an inequality, such as x>3, on a number line, first draw a circle over the number (e.g., 3).




**Step 2** Then if the sign includes equal to (≥ or ≤), fill in the circle. If the sign does not include equal to (> or <), leave the circle unfilled in.




**Step 3** Finally, draw a line going from the circle in the direction of the numbers that make the inequality true.




## Properties of Inequalities

### Addition and Subtraction

If a > b, then a + c > b + c
If a > b, then a - c > b – c

### Multiplication and Division

If a > b, then ac > bc, if c > 0
If a < b, then ac < bc, if c <0

## Steps to Solving Inequalities

**Step 1** Eliminate fractions by multiplying all terms by the least common denominator of all fractions. Remember, when multiplying both sides by the same negative number, reverse the inequality symbol.

**Step 2** Add or subtract quantities to obtain the unknown on one side and the numbers on the other.

**Step 3** Simplify by combining like terms on each side of the inequality.

**Step 4** Eliminate any remaining coefficient of the variable by dividing both sides of the equation by the same coefficient. Remember, when dividing both sides by the same negative number, reverse the inequality symbol.

Remember, to solve an inequality, you can:

- Add the same quantity to both sides.
- Subtract the same quantity from both sides.
- Multiply both sides by the same positive number.
- Divide both sides by the same positive number.
- Multiply both sides by the same negative number and reverse the sign.
- Divide both sides by the same negative number and reverse the sign.

## What is Nearpod?

Nearpod helps educators make any lesson interactive whether in the classroom or virtual. The concept is simple. A teacher can create interactive presentations that can contain Quiz's, Polls, Videos, Collaborate Boards, and more.

With Nearpod, students do not need accounts to access! When you start a lesson, you'll launch a five-letter code. Share this code with students, or share the lesson through your LMS (like Canvas or Schoology), Google Classroom, or Microsoft Teams

PC

www.Nearpod.com

App Store

https://apps.apple.com/us/app/nearpod/id523540409

Google Play

https://play.google.com/store/apps/details?id=com.panareadigital.Nearpod&hl=en_US&gl=US

## How do I Start Using Nearpod?

Learn these three things and begin teaching with Nearpod:

1. There are TWO ways to launch a lesson & both give you student feedback!
    - Live Lesson Option: Teachers share a live session, students enter a code, and the lesson is synced to all devices. This is perfect for running a lesson with a video conferencing solution.
    - Student Paced Option: Share a lesson code for student's to complete at their own time and pace, in order to create a more flexible and equitable remote teaching experience.
2. You can use our editable ready-to-run lessons! Choose from 8,000+ ready-to-run editable lessons and customize any of these lessons to fit your students' needs!
3. Digitize your paper-based lessons! Save prep time by importing existing lessons (pdfs, jpegs, ppts) and adding Virtual Field Trips, Collaborate boards, Quizzes, Polls, Matching Pairs activities + more. Or, start in Nearpod OR Google Slides add your favorite Nearpod activities. It's that easy.

## Final Tips for Virtual Instruction

1. Pick your app and stick with it.
2. Communicate clearly.
3. Archive your resources for future use.
4. Apply research-based instructional strategies.
5. No IP Address left behind! Accountability matters.
6. Simplify.
7. Give sufficient brain breaks.
8. Make it fun!
9. Allow for accessibility.
10. Promote collaboration and digital citizenship.

## Resources from the World Wide Web

The following are resources referenced in the workshop, as well as additional sites that expand the information.

How to Graph Inequalities for Middle School: Fractions & Other Math Tips

https://www.youtube.com/watch?v=PTDN-ApjzsM

How to Solve Inequalities

https://www.youtube.com/watch?v=DrZJKdXlZ3I

One-Variable Inequalities - Khan Academy

https://www.khanacademy.org/math/algebra/one-variable-linear-inequalities

Virtual Nerds: What is an Inequality?

https://www.youtube.com/watch?v=wcBwdz-ZBaM

Math is Fun - Solving Inequalities

https://www.mathsisfun.com/algebra/inequality-solving.html

Very Basics of Graphing Inequalities (on a number line)

https://www.youtube.com/watch?v=nif2PKA9bXA

Solving and Graphing Inequalities (Excellent!)

https://www.youtube.com/watch?v=EE2qW1yjKDO

Math Dude Unit 1-4 -Solving Inequalities

https://www.youtube.com/watch?v=9fbRKV34nt0

Solving Linear Inequalities - Event Planning

www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=35103C4421814CCDCF2B F60B532270EE0718F330D6DCACE4E33EFA989573B6E6

Florida IPDAE - GED and AHS Lessons Beginning Algebra - Lessons 14-15

http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=DA077C783C76A85D93EE670F44851D4C70E44B31245B6D1B60A314A7FABD6FAE

Inequalities in the Real-World

https://betterlesson.com/lesson/592219/inegualities-in-the-real-world

Inequalities - Solving and Graphing

https://teacher.desmos.com/activitybuilder/custom/57d9fdc6ebf48f73093807b2

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