

# Going Viral

## Solving Equations



Mariah Warren

Published by K20 Center

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<b>Grade Level</b>	7th – 9th Grade	<b>Time Frame</b>	1-2 class period(s)
<b>Subject</b>	Mathematics	<b>Duration</b>	90 minutes
<b>Course</b>	Algebra 1, Middle School Mathematics, Pre-Algebra		

### Essential Question

How can you represent, compare, and order numbers to solve an equation?

### Summary

This lesson focuses on teaching students how to solve algebraic equations using student-friendly language. Students will try to solve viral math posts in groups. Then, they learn the Do/Undo method, practice with sample problems, and evaluate how viral math posts can be written and solved. Students then create their own viral math posts, and solve their classmates' equations. This lesson includes optional modifications for distance learning. Resources for use in Google Classroom are included.

### Snapshot

#### Engage

Students examine a four-square diagram and determine on their own which of four pictures doesn't belong with the rest. Then, using the Four Corners strategy, students convince their peers to join their side. Then, groups review their choices and discuss how like things can be grouped.

#### Explore

In groups of six, students form strategies for solving viral math posts and peer-review their group mates' answers.

#### Explain

Students view a demonstration of the Do/Undo method for solving equations and practice solving sample problems.

#### Extend

Students generate their own algebraic equations and display them as viral math posts.

#### Evaluate

Using the Gallery Walk strategy, students view and solve other students' viral posts.

## Standards

*Oklahoma Academic Standards for Mathematics (Grade 7)*

**7.A.3.1:** Write and solve problems leading to linear equations with one variable in the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are rational numbers.

*Oklahoma Academic Standards for Mathematics (Grade 7)*

**PA.A.4.1:** Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.

*Oklahoma Academic Standards for Mathematics (Grade 7)*

**A1.A.1.1:** Use knowledge of solving equations with rational values to represent and solve mathematical and real-world problems (e.g., angle measures, geometric formulas, science, or statistics) and interpret the solutions in the original context.

## Attachments

- [Four-Corners-Signs-Going-Viral.docx](#)
- [Four-Corners-Signs-Going-Viral.pdf](#)
- [Gallery-Walk-Going-Viral.docx](#)
- [Gallery-Walk-Going-Viral.pdf](#)
- [Gallery-Walk—Going Viral - Spanish.docx](#)
- [Gallery-Walk—Going Viral - Spanish.pdf](#)
- [Lesson-Slides-Going-Viral.pptx](#)
- [Pass-the-Problem-Going-Viral - Spanish.docx](#)
- [Pass-the-Problem-Going-Viral - Spanish.pdf](#)
- [Pass-the-Problem-Going-Viral.docx](#)
- [Pass-the-Problem-Going-Viral.pdf](#)
- [Sample-Problems-Going-Viral.docx](#)
- [Sample-Problems-Going-Viral.pdf](#)

## Materials

- Going Viral Lesson Slides (attached)
- Four Corners Signs (attached)
- Pass the Problem handouts (attached; one set of handouts for every group of six students)
- Gallery Walk handout (attached)
- Sample Problems (attached)
- Sticky easel pad paper
- Markers (Mr. Sketch, Sharpie, etc.)
- Colored pencils
- Pens/pencils
- Internet-connected devices for students (optional)

# Engage

## Teacher's Note: Preparation

Prior to beginning the lesson, print out the attached Four Corners signs and post them in four corners of your classroom. In the attached **Lesson Slides**, slide four contains a "Which One Does Not Belong" image to be used in conjunction with the [Four Corners](#) strategy. If you choose, you can also select other similar pictures to use from [this site](#) (full URL available in the Resources at the end of the lesson, and in slide four's notes).

Introduce the lesson using the attached **Lesson Slides**. **Slide two** displays the lesson's Essential Question: *How can you represent, compare, and order numbers to solve an equation?* **Slide three** identifies the lesson's learning objectives. Review each of these with your class to the extent you feel necessary.

Go to **slide four**. Ask students to consider which item pictured does not match the others and why. Use the [Four Corners](#) strategy by instructing students to go to the corner with the name of the item they do not believe fits with the rest. Invite each group to discuss among themselves how to convince others to join their group. Allow 1–2 minutes for this discussion, then have each corner select a spokesperson to share out their reasoning. Allow others to change corners.

## Optional: Additional Four Corners

The picture used on slide four comes from [this website](#). You may choose to use a different Four Corners picture. If you choose, you can do this activity multiple times, duplicating slide four as necessary.

## Possible Student Responses

There is no right or wrong answer, as correct rationales can be found for why different images don't belong to the group. For example, the students may argue that the pennies are the only non-silver coin, the quarter is the only single coin, the nickels are the only coins that are tails up, etc.

## Optional Modification For Distance Learning

To make the above Which One Doesn't Belong? activity accessible for online or distance learning, you may choose to have students select which image they feel is the misfit and justify their reasoning in a discussion board on a web-based platform (e.g., [Google Classroom](#)) instead of representing their choice in four corners of the room. [Download all attachments to use this lesson in Google Classroom.](#)

## Explore

Go to **slide five** and introduce the [Pass the Problem](#) activity. Pair students into partners and then into larger groups, with three sets of partners per group. Pass out the attached sets of **Pass the Problem handouts** to each group. The handout contains three problems, one for each pair within a group to circulate. Inform the students they will attempt to solve these viral math posts. Each partner set within a group will start with a different viral post and solve it using the Pass the Problem strategy, as instructed on slide five. Give students 2–3 minutes to solve only the **first** line of the handout.

### Teacher's Note: Timing The Rotations

Feel free to adjust the timing of the rotations in the Pass the Problem activity based on your students' abilities.

When time is up, direct students to pass the problem to another pair in their group. The new pair should check the first pair's work on the first line, make any necessary corrections, and then solve only the **second** line. Give students 3–4 minutes to complete this round.

When time is up for the second round, direct the student to pass the problem to the pair that hasn't worked on that viral post yet. This pair should check the first **and** second pair's work on the first and second lines, make any necessary corrections, and then solve only the **third** line. Give students 4–5 minutes to work this round.

Finally, direct students to return the viral post to the original pair that started it. This pair should check all of the work on the handout and solve the **final** line.

### Optional Modification For Distance Learning

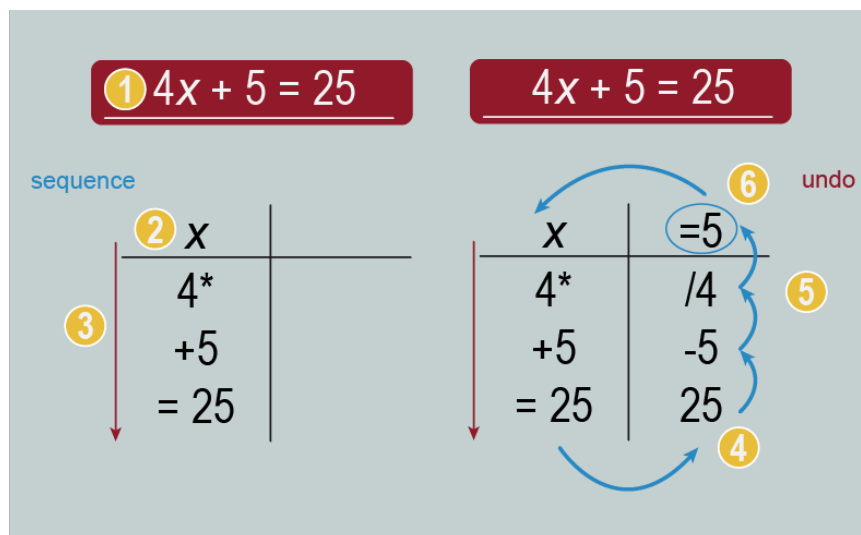
To make the above Pass the Problem activity accessible for distance learners, you may choose to assign each student a whole problem from the Pass the Problem handouts. Then, once students have completed their problems, you can allow them to check each others' answers using a website such as [Voice Thread](#). You can upload students' answers to the viral math posts ahead of time onto the site, and then students can choose whether they would like to make a quick video, a voice memo, or a written note to provide their feedback on other students' answers. [Download all attachments to use this lesson in Google Classroom.](#)

After the groups have completed their handouts, go through **slides 6–8** to review the answers to each part of the problem.

# Explain

Use **slides 9-19** to demonstrate the "Do/Undo" method for solving equations. You can use [this video](#) on **slide nine** (the full URL can also be found in Resources below) to demonstrate the method, or see below for instructions and sample problems. Slides 10, 12, 14, 16, and 18 are hidden and show the method for solving the problems on the previous slide. You may choose to unhide these solution slides as you go over the problems. Introduce the terms *coefficient*, *constant*, and *variable* as you work these problems with the students.

## Solving Equations with Undo Tables



Right side: Setting up a Do/Undo table. Left side: Solving an equation by completing the table. The answer, circled, is mirrored opposite the variable.

1. Begin by combining like terms and introducing a variable.
2. Isolate the variable you are solving for.
3. List in steps what is happening to the variable, using order of operations. In the below example,  $x$  is first multiplied by four, then added to by five, which is taken to equal 25.
4. Mirror the bottom-most value (25, in the above example) by copying it to the bottom row to the right of the T.
5. Working from the bottom to the top on the right side of the T, write the operation opposite to the one on the right. In the above example,  $+5$  is opposite of  $-5$ , and  $/4$  is opposite of  $*4$ .
6. Using the bottom-most number, perform each operation, working up. Write your final number on the top-right of the T, mirroring the variable. To check your answer, plug it into the variable in the starting position and perform the operations below, from top to bottom. If it then equals the number on the bottom-left, you've confirmed the answer is correct.

Move to **slide 20**. Select problems from the attached **Sample Problems** for students to work on using the Do/Undo method. You may do as many of these problems with your students as you see fit.

### Teacher's Note: Additional Pre-Algebra Standard

Consider including a graphing application for pre-algebra students, in order to meet that aspect of their standard.

## Extend

Go to **slide 21**. Invite students to generate their own algebraic expressions and display them as a viral math post, similar to the ones they solved on the Pass the Problem handout. To do so, have them follow the directions on the slide:

- Ask students how these viral posts are designed to trick people (e.g., the order of operations, distracting lines, etc.)
- Have students begin by deciding on their variables (e.g., pictures, emojis, etc.)
- Students should have at least four lines and three variables included in their viral math post.
- Students must also create a separate answer key for their problem.

### Teacher's Note: Guiding The Activity

Check students' work during the rough drafts to ensure they are creating posts that are challenging, but solvable.

Once students have completed and checked their rough drafts, invite them to create a poster for their final draft.

### Optional: Technology Integration

You may also choose to have students to create visuals for their viral posts using [Piktochart](#), [Google Drawings](#), [Canva](#), or a similar presentation app or program.

# Evaluate

Go to **slide 22** and pass out the attached **Gallery Walk handout** to each student. Have the class display their final drafts around the room and conduct a [Gallery Walk](#). Ask each student to solve the math posts of five other students, using their handouts. After students have solved five posts, ask each student to present the answer key for their viral math post in order for everyone to check their work.

## Optional Modification For Distance Learning

If conducting this lesson in an online or distance learning environment, you may choose to omit the Gallery Walk activity. You can substitute a peer review activity, with a website such as [VoiceThread](#). With VoiceThread, you can upload students' posts to the site; then, students can choose whether they would like to make a quick video, a voice memo, or a written note to solve other students' problems.

[Download all attachments to use this lesson in Google Classroom.](#)

## Resources

- Danielson, C., Gael, A., Hunter, C., Wyborne, S., Overwijk, A., Calculus, M. B., Geometry, T. P., Rachel Fruin Shapes. (n.d.). Which One Doesn't Belong? <https://wodb.ca/shapes.html>
- K20 Center. (n.d.). Canva. Tech Tools. <https://learn.k20center.ou.edu/tech-tool/612>
- K20 Center. (n.d.). Four Corners. Strategies. <https://learn.k20center.ou.edu/strategy/138>
- K20 Center. (n.d.). Gallery Walk. Strategies. <https://learn.k20center.ou.edu/strategy/118>
- K20 Center. (n.d.). Google Classroom. Tech Tools. <https://learn.k20center.ou.edu/tech-tool/628>
- K20 Center. (n.d.). Google Drawings. Tech Tools. <https://learn.k20center.ou.edu/tech-tool/629>
- K20 Center. (n.d.). Pass the Problem. Strategies. <https://learn.k20center.ou.edu/strategy/151>
- K20 Center. (n.d.). Piktochart. Tech Tools. <https://learn.k20center.ou.edu/tech-tool/2394>
- Ohashi, R. (2013, October 19). Solving Equations with Undo Tables [Video]. YouTube. <https://www.youtube.com/watch?v=aOnHNP-giYQ>