

TITLE OF LESSON

Algebra 1 Unit 1 Lesson 16 – Order of Sets and Infinite Sets  
*You Do Speak Math: Creation of the Individual*

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TIME ESTIMATE FOR THIS LESSON

One class period

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ALIGNMENT WITH STANDARDS

California – Algebra 1:

Preliminary lesson necessary for the development of:

**5.0** Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification of each step.

**7.0** Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.

**8.0** Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.

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MATERIALS

Rulers

CD/tape player (Computer with CD drive)

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LESSON OBJECTIVES

- To introduce the infinite sets
  - To introduce ordering of sets
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EXPLANATION OF LESSON

We will continue with our work on sets. The infinite sets will be more fully developed. We will introduce the ordering of sets.

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FOCUS AND MOTIVATE STUDENTS

- 1) Homework Check – Stamp/initial complete homework assignments. Pass back graded work and have students place in their folders.
  - 2) **Agenda** – Have students copy the agenda you have posted.
  - 3) Present Homework – Ask students to volunteer results from last night’s homework. Have them write the numbers that represent their sets on the board
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ACTIVITIES – INDIVIDUAL AND GROUP

1. Ordering Sets Intro – Introduce the idea of the order in sets. Use the number line as a way to represent ordered sets. What might be another way to determine order? We organize in terms of time – the number line works well for that – but what else do we use to help us organize?
2. Discuss: Ordering Sets – Lead a discussion on the ordering of sets. Do we always have order in sets? What types of sets are ordered? What types of sets are not ordered?
3. **Brainstorm** examples.

4. Teacher Demo – Demonstrate how one can add two ordered sets together while keeping the order intact. Demonstrate the ordering of added sets.
5. Paired Work – Break students into pairs based on seating. Have them work together to brainstorm examples of ordered sets that can be combined into ordered sets. What about music? Sports? What about space (immediately around us and as large as the solar system, etc.)?
6. Infinite Sets – Lead a discussion on the idea of the infinite set. Elicit examples from the students. This may prove to be a bit tricky. One way to show that a set is infinite is to show that there is always another member, no matter how many you have listed or that given any two elements in a set there is always another in between. You are only introducing the idea here, so don't worry too much about being able to think on your feet of that one more thing you can add to a seemingly finite set. Explain that many sets we may have thought were finite are really infinite.
7. Countable Sets and Non-Countable Sets – Discuss sets that can be counted and those that cannot. What are some examples of each? Have them brainstorm and argue. This, again, is a discussion to have them start thinking about this idea. It is not as important at this point, if they are right or wrong as it is to get them to defend their ideas. This might be a good time to remind them that what we *know* changes every day, every year. Science and exploration continue to crush things we've held as absolutes. And some of the things we take for granted today, things we know without question, sounded completely insane when the ideas were raised for the first time. If the people who raised them, or at least one of the people who raised each of them, had stood up and defended his or her ideas, we might never know what we know today.
8. Teacher Demo: Set Equations – Demonstrate the idea of the equation and how it can represent a set. For example, in their homework assignment for Lesson 7, they determined that *My Weight + Bill's Weight + Jill's Weight = The Weight of the People I Skated with Last Night* is an equation. It is also an equation that represents a set. Ask them to rewrite this equation with variables so it's easier to read, or at least to write. If they need prompting, start with the first thing first – what variable can we use for *My Weight*? They may want to use  $W_1$ , or they may want to use  $m$  (for my). Write that on the board. Then move on to the next one. Bill's weight could then be  $W_2$  or  $b$ . Have them continue from there. They'll end up with something along the lines of:  $m + b + j = w$ .
9. Teacher Demo 2 – Ask them, with sets, then, what does the information on the left side of this equation tell us? (The members of the set.) And the information on the right? (The rule of the set.) Do one more, using something one of the students suggests.
10. Number Line – If you have time, demonstrate the number line and ways to represent finite and infinite sets.
11. Homework Review.

#### HOMEWORK

Have the students come up with two infinite and two finite sets. Have them represent these sets by number lines.

#### GROUP ROLES

Students will be working individually during this class period, unless a student needs help.

#### DOCUMENTATION FOR PORTFOLIO

None