



Math Lab Lesson #6: Proportions

How can we reason proportionally?

SITUATING THE LESSON:

During next Saturday Academy, students will:

- Interpret word problems that rely on proportional reasoning, including those that require slight estimation/rounding.
- Justify the “cross-multiply” algorithm for solving a proportion with an unknown, as well as verifying a proportional relationship.

Summary: In this lesson, students will:

- Preview some of the key ideas that they will learn during next Saturday Academy Lesson 8 about how to operate with proportions
- Do a Group Activity which requires proportional reasoning and measuring.
- Play the pattern game “Set” or start Homework #8 (Cumulative Review)

Preparation Before Class: Work through all problems and watch videos in advance. Read through and annotate the Lesson Plan in a way that will be useful to you. There is no Instructor Answer Key this week.

Materials:

- **Math Lab Lesson #6: Classwork** (1 per student and instructor)
- **Math Lab Lesson #6: Group Activity** (1 per student and instructor)
- **12 inch / 30 cm rulers** (8 per instructor)
- **10 foot tape measure** (8 per instructor)
- **“Set” Game**
- **Cumulative Review Homework** (1 per student and instructor)



1st Hour

1. Lesson Launch (5 min)

A) SATURDAY ACADEMY AND WEEKDAY REVIEW (5 MIN)

- Ask students what they have been learning in Saturday Academy and Weekday. What has been interesting? What have they struggled with? Take a few responses and jot them on the board.
- Ask students to get out their Workbook and find a Classwork (Level 1 or Level 2) problem that they understand. Have them pair up and give them one minute to explain it to their partner, then switch.
- Explain that this week we will start with the Group Activity

2. Individual Work: Math Lab Videos (45 min)

- Hand out the Classwork and help students access the following videos:
 - Video #1: Introduction to Proportions
 - Video #2: Equivalent Fractions
 - Video #3: Some Word Problems with Proportions
 - Video #4: Proportions and Estimation
- Direct students to take notes on the videos on their Classwork. Let them know that they should feel free to pause or rewind the video if anything is unclear, and they should raise their hand if they would like you to help them one-on-one.
- Once a student is done watching a video, they should **complete the Classwork problems that relate to that video**. After they do this (and ask any clarifying questions), they should start the next video.
- As you circulate, make sure that students are focused and on track (i.e. not surfing the web), and provide hints and help as needed.

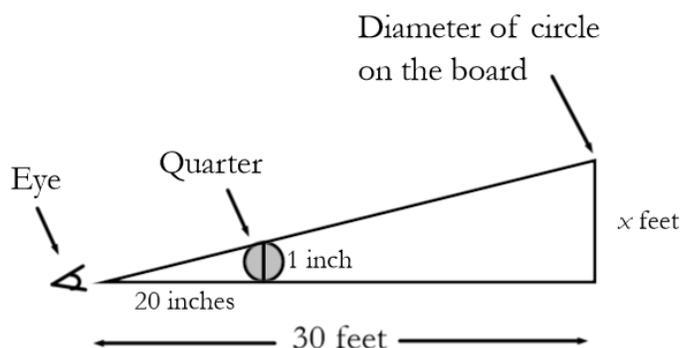
3. Break (5 min)



2nd Hour

4. Group Activity and Presentations (25 min)

- Draw a circle on the board. Review what the diameter of the circle is.
- Hand out the Group Activity, and distribute tape measures and rulers as necessary. Have students work on this activity groups of three or four. Circulate and provide support.
- The purpose of this activity is to see how proportions could be used to estimate unknown measures. This kind of reasoning was used by astronomers to estimate the distance to the moon, for example.
- Have students come up with a plan themselves, don't just tell them how to do it. For example:



In this example, a student is holding a quarter (which has a diameter of approximately 1 inch) about 20 inches in front of her, and standing 30 feet away from the board. She could set up the following proportion and solve for x .

Equation Used	Estimate of Diameter
$\frac{1 \text{ inch}}{20 \text{ inches}} = \frac{x \text{ feet}}{30 \text{ feet}}$	1.5 feet

- Have all groups write their solutions on the board and present them. There will likely be different answers due to imprecise measuring or rounding. Use this as an opportunity to discuss estimation and measurement error.

5. Game Time or Cumulative Review Homework (25 min)

- Hand out the game “Set” and explain the rules. Circulate as students play.
- Alternatively, allow students to work on their Cumulative Review Homework.