Ratios of Similar Triangles

ID: 11060

Time required
20 minutes

Activity Overview

In this activity, students will explore two ways of comparing side lengths of similar triangles. They will calculate ratios and change the triangles to see how the ratio changes. Then they will write proportions using the ratios.

Topic: From Arithmetic to Algebra

- *Ratios*
- *Proportions*
- *Similar Triangles*

Teacher Preparation and Notes

- *The up and down arrows on the screen of pages 1.4 and 2.2 will change the scale factor, thus changing the size of △**B**.*
- *The answers to the questions in the TI-Nspire document (.tns file) can be seen if the document is opened using the TI-Nspire Teacher Edition software.*
- *When using the **Length** tool, the cursor will highlight the entire triangle. Press tab to highlight only the side.*
- *When using the **Calculate** tool, the handheld will ask for things in alphabetical order, not always numerator then denominator. Make sure that students select the correct value when calculating the ratios.*
- ***To download the student TI-Nspire document and student worksheet, go to education.ti.com/exchange and enter "11060" in the keyword search box.***

Associated Materials

- *RatiosOfSimilarTriangles_Student.doc*
- *RatiosOfSimilarTriangles.tns*

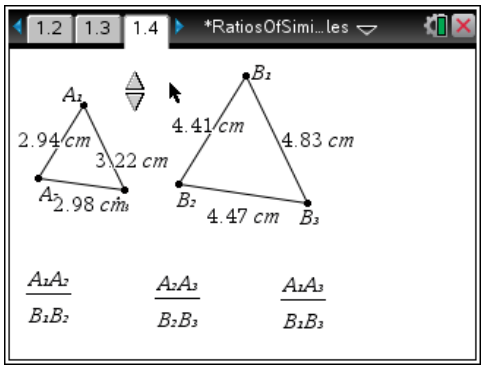
Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

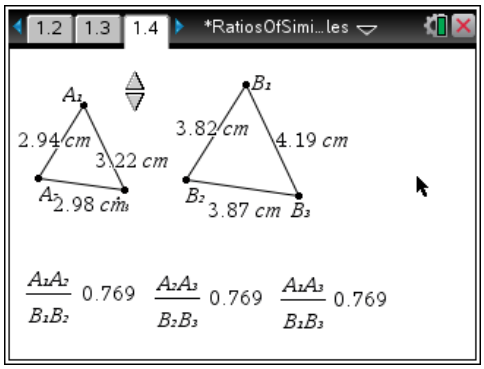
- *Scale Factor (TI-Nspire technology) — 8299*
- *What's the Scale? (TI-84 Plus family with TI-Navigator) — 7631*
- *Math TODAY: Wing Tabs Save Fuel (TI-84 Plus family) — 7645*

Problem 1 – Ratios of corresponding sides

Discuss with students the difference between a ratio and a proportion. They are given the definitions on page 1.2.



On page 1.4, students will find two similar triangles ($\triangle A \sim \triangle B$). They need to find the lengths of each side of both triangles using the **Length** tool (**MENU > Measurement > Length**). Students must use the tab key to switch to the length of the side of the triangle from the whole triangle. Then students can use the **Calculate** tool (**MENU > Actions > Calculate**) to find the ratios shown on the page.



Students will answer questions about the ratios on pages 1.5 to 1.8. They should see that the three ratios are equal and if the triangle changes shape or the scale factor changes, the ratios remain equal to each other.

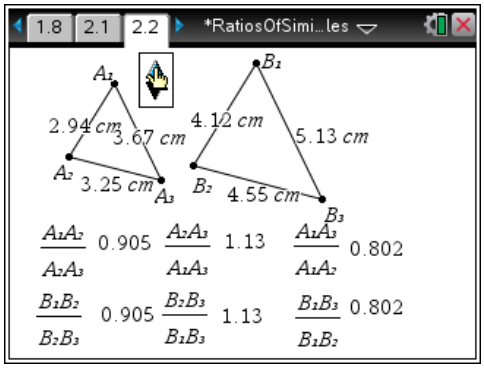
The proportion that students are to create should show all three ratios equal to each other.

However, they may create more than one proportion such as

$\frac{A_1A_2}{B_1B_2} = \frac{A_2A_3}{B_2B_3}$, $\frac{A_2A_3}{B_2B_3} = \frac{A_1A_3}{B_1B_3}$, and $\frac{A_1A_2}{B_1B_2} = \frac{A_1A_3}{B_1B_3}$.

Problem 2 – Ratios of two sides of a triangle

Page 2.2 shows the same two similar triangles as in Problem 1 ($\triangle A \sim \triangle B$). Again, students will need to find the side lengths before finding the ratios shown on the page. This time the ratios compare two side lengths of one triangle.



Students should come to the conclusion that the ratios that compare the same two lengths of corresponding triangles are equal.

For example, $\frac{A_1A_2}{A_2A_3} = \frac{B_1B_2}{B_2B_3}$.

Wrap up the activity with a discussion about what the proportions are used for. Explain to students that a proportion can be solved to find a missing side length, if you know two side lengths from one triangle, and one corresponding side length from a similar triangle.

Problems 1 and 2 are two different ways to set up the proportion given the same information.

For example, suppose you need to find A_1A_2 and are given A_2A_3, B_1B_2, and B_2B_3.

Using Problem 1, the proportion would be $\frac{x}{B_1B_2} = \frac{A_2A_3}{B_2B_3}$.

Using Problem 2, the proportion would be $\frac{x}{A_2A_3} = \frac{B_1B_2}{B_2B_3}$.