Ratios of Similar Triangles

ID: 11059

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 point on the line underneath SCALE will change the scale factor, thus changing the size of ∆DEF.*
- *When using the **D. & Length** tool, the cursor will highlight the entire triangle. Press 2nd to highlight only the side.*
- ***To download the Cabri Jr. file and student worksheet, go to education.ti.com/exchange and enter "11059" in the keyword search box.***

Associated Materials

- *RatiosOfSimilarTriangles_Student.doc*
- *RATIO.8xv*

Suggested Related Activities

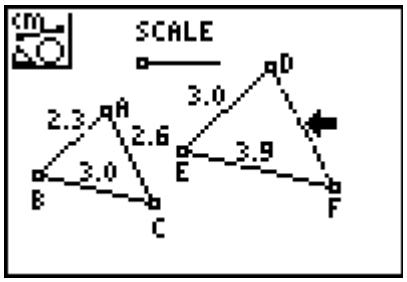
To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

- *Scale Factor (TI-84 Plus family) — 10233*
- *What's the Scale? (TI-84 Plus family) — 7631*
- *Math TODAY: Wing Tabs Save Fuel (TI-84 Plus family) — 7645*

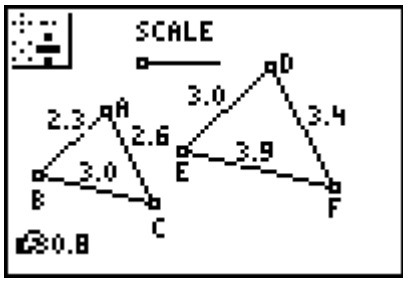
Problem 1 – Ratios of corresponding sides

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

In the RATIO file, students will find two similar triangles ($\Delta ABC \sim \Delta DEF$). They need to find the lengths of each side of both triangles using the **D. & Length** tool (**F5 > Measure > D. & Length**).

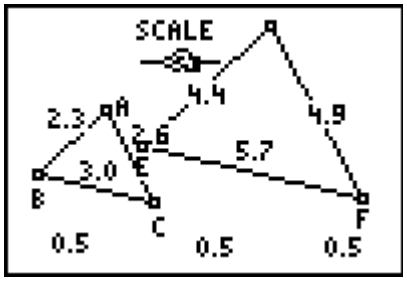


Then students can use the **Calculate** tool (**F5 > Calculate**) to find the ratios shown on the worksheet. To do this, students need to select the value of the numerator, press ÷, and then select the value of the denominator. To see more decimal place, students can place their cursor over the measurement and then press +.



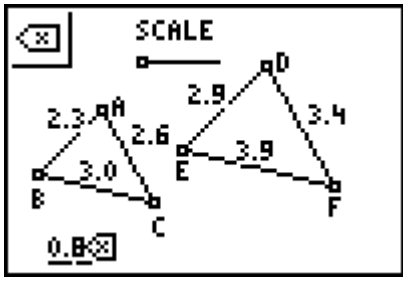
Students will answer questions about the ratios on the worksheet. They should see that the three ratios are equal and if the triangle changes shape or the scale factor changes, the ratios remain equal to each other.

The proportion that students are to create is all three ratios equal to each other. However, they may create more than one proportion such as $\frac{AB}{DE} = \frac{BC}{EF}$, $\frac{BC}{EF} = \frac{AC}{DF}$, and $\frac{AB}{DE} = \frac{AC}{DF}$.

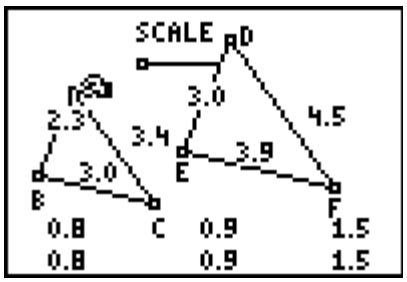


Problem 2 – Ratios of two sides of a triangle

Students will use the same file RATIO for this problem, but they will need to first delete the three ratios that they calculated using the **Clear > Object** command.



This time students will calculate ratios, found on the worksheet, that compare two side lengths of one triangle. They should place the ratios on the screen as they appear on the worksheet, with one above the other. This is important to students making the following connection.



Students should come to the conclusion that the ratios that compare the same two lengths of corresponding triangles are equal. For example, $\frac{AB}{BC} = \frac{DE}{EF}$.

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 *AB* and are given *BC*, *DE*, and *EF*.

Using Problem 1, the proportion would be $\frac{x}{DE} = \frac{BC}{EF}$.

Using Problem 2, the proportion would be $\frac{x}{BC} = \frac{DE}{EF}$.

Solutions – student worksheet

1. They are the same.

2. The value of the ratios change, but the three ratios remain equal to each other.

3. The value of the ratio does not change and the three ratios remain equal to each other.

4. $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

5. The two ratios comparing the same sides of the triangle are the same value.

6. The ratios do not change in value when the points are moved. The two ratios remain equal to each other.

7. The ratios change when the similar triangle changes size. The two ratios remain equal to each other.

8. $\frac{AB}{BC} = \frac{DE}{EF}, \frac{BC}{AC} = \frac{EF}{DF}, \frac{AC}{AB} = \frac{DF}{DE}$