



Objectives.

- Students will to identify the relationship between the scale factor of similar figures and their perimeters.
- Students will to identify the relationship between the scale factor of similar figures and their areas.
- Students will be able to identify the relationship between the scale factor of similar 3-D figures and their surface areas.
- Students will be able to identify the relationship between the scale factor of similar 3-D figures and their volumes.

Vocabulary

- | | |
|--------------------|-------------------|
| • Similarity ratio | • Similar figures |
| • Perimeter | • Pentagon |
| • Surface Area | • Cube |
| • Volume | • Triangle |

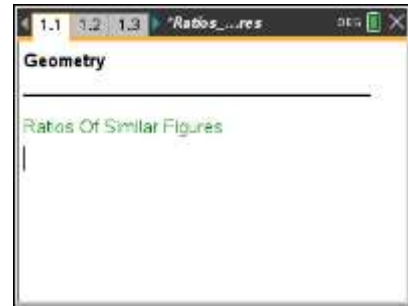
About the Lesson

- To complete this activity, students will need to know how to change between pages, grab and move points.
- The multiple choice items are self-check and students can check them by pressing **Menu > Check answer**.
- Notes for using the TI-Nspire™ Navigator™ System are included throughout the activity. The use of the Navigator System is not necessary for completion of this activity.
- Teaching time: 30 - 45-minutes.



TI-Nspire™ Navigator™

- Send out the Ratios_of_Similar_Figures.tns file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.



Tech Tips:

- This lesson includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products, including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the lesson for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>.

Lesson Files:

Student Activity

- Ratios_of_Similar_Figures_student.pdf

TI-Nspire document

- Ratios_of_Similar_Figures.tns



Lesson Materials

- Compatible TI Technologies:



TI-Nspire™ CX Handhelds,



TI-Nspire™ Apps for iPad®,

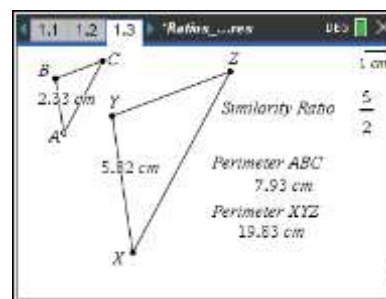


TI-Nspire™ Software

Problem 1 – Similar Triangles

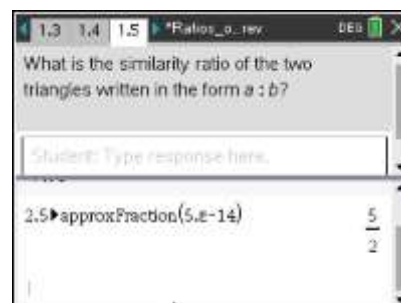
Pages 1.2 to 1.11 on the handheld.

Students will begin this activity by looking at similar triangles. Students are given two triangles that are similar. They are also given the perimeter or area of the triangle. They will discover that the ratio of perimeters of similar figures is $a : b$ and the ratio of areas of similar figures is $a^2 : b^2$. Students will be asked to collect data by moving point A. Students are asked several questions about the relationships in the triangle.



TI-Nspire Navigator Opportunity: Screen Capture - Here and throughout the lesson you can use screen capture to ensure students are able to move point A to manipulate the figure.

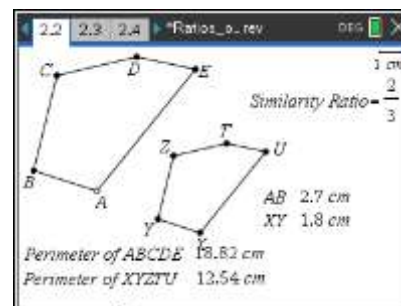
Students will need to use the calculator to find the ratios. Once the ratio is found, have them **round** to hundredths and then use the approxFraction command if needed. **(MENU > Number > Approximate to Fraction)**



Problem 2 – Similar Figures

Pages 2.1 to 2.13 on the handheld.

In Problem 2, students will be asked to repeat the exercise for Problem 1 on similar pentagons.

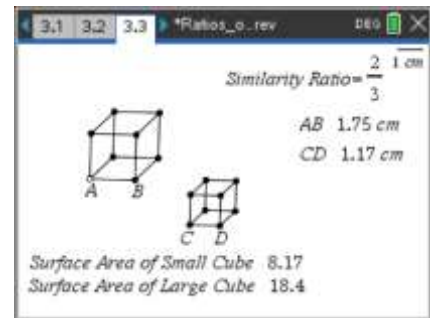




TI-Nspire Navigator Opportunity: Quick Poll - This is a good place to ask a quick poll to assess student understanding. You may choose to ask for the perimeter of Pentagon XYZTU for different values of the perimeter of Pentagon ABCDE.

Problem 3 – Extension to Three-Dimensional Figures Pages 3.1 to 3.14 on the handheld.

In Problem 3, students will apply what they have learned from Problems 1 and 2 to three-dimensional figures.



Student Solutions

1. Sample Answers

Position	AB	XY	Perimeter of XYZ	Perimeter of ABC	Ratio of Perimeters (Round to 2 decimals)
1	2	5	18.34	7.336	2.50
2	3.26	8.15	22.474	8.99	2.50
3	2.87	7.17	21.882	8.753	2.50
4	6.82	17.05	41.201	16.480	2.50

2. 5 : 2
3. 5 : 2
4. They are the same
5. Sample answers

Position	AB	XY	Area of XYZ	Area of ABC	Ratio of Areas (Round to 2 decimals)
1	2	4.99	13.262	2.122	6.25
2	3.29	8.22	21.934	3.509	6.25
3	2.68	6.69	17.871	2.859	6.25
4	6.82	17.06	45.371	7.259	6.25



Ratios of Similar Figures

GEOMETRY

6. 25 : 4
7. They are squares of the ratio of the triangles similarity ratio.
8. Sample answers

Position	<i>AB</i>	<i>XY</i>	Perimeter of <i>XYZTU</i>	Perimeter of <i>ABCDE</i>	Ratio of Perimeters (Round to 3 decimals)
1	3	2	13.35	20.025	0.666
2	3.23	2.15	12.258	18.387	0.666
3	2.54	1.69	12.181	18.271	0.666
4	7.31	4.87	13.403	20.104	0.666

9. 2 : 3 (Students may struggle with this because to get the EXACT ratio they will need to realize the ratio is actually 0.6 repeating.)
10. 2 : 3 (Same issue as on question 9)
11. They are the same
12. Sample answers

Position	<i>AB</i>	<i>XY</i>	Area of <i>XYZTU</i>	Area of <i>ABCDE</i>	Ratio of Areas (Round to 3 decimals)
1	3	2	8.803	19.806	0.444
2	3.29	2.19	9.003	20.256	0.444
3	2.63	1.75	9.081	20.431	0.444
4	6.81	4.54	8.929	20.091	0.444

13. 4 : 9 (Students may struggle with this because to get the EXACT ratio they will need to realize the ratio is actually 0.4 repeating.)
14. They are the squares of the similarity ratio of the pentagons.
15. a : b
16. $a^2 : b^2$
17. Sample answers

Position	<i>AB</i>	<i>XY</i>	Surface Area of <i>Small Cube</i>	Surface Area of <i>Large Cube</i>	Ratio of Surface Areas (Round to 3 decimals)
1	3	2	24.007	54	0.444
2	3.1	2.07	25.633	57.7	0.444
3	2.65	1.77	18.727	42.1	0.444
4	5.22	3.48	72.647	163	0.445

18. 2 : 3



19. 4 : 9 (Students may struggle with this because to get the EXACT ratio they will need to realize the ratio is actually 0.4 repeating.)
20. The surface area ratio is the square of the similarity ratio.
21. Sample answers

Position	<i>AB</i>	<i>XY</i>	Volume of <i>Small Cube</i>	Volume of <i>Large Cube</i>	Ratio of Volumes (Round to 6 decimals)
1	2	1.5	3.378164557	8.007501172	0.421875
2	3.3	2.48	15.228841627	36.097994969	0.421875
3	1.75	1.31	2.272069582	5.385646417	0.421875
4	4.61	3.46	41.420730442	98.182472158	0.421875

22. 27 : 64
23. They are cubes of the similarity ratio
24. $a^2 : b^2$
25. $a^3 : b^3$



Ratios of Similar Figures

TEACHER NOTES

GEOMETRY

