

Ratios of Similar Figures

ID: 12365

Time Required

30–45 minutes

Activity Overview

In this activity, students will explore the ratio of perimeter, area, surface area, and volume of similar figures in two and three dimensional figures.

Topic: Ratio, Proportion & Similarity

- Ratio of perimeter, area, surface area, and volume

Teacher Preparation and Notes

- 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.
- To download the student TI-Nspire document (.tns file) and student worksheet, go to education.ti.com/exchange and enter “12365” in the quick search box.

Associated Materials

- [Ratios_of_Similar_Figures_Student.doc](#)
- [Ratios_of_Similar_Figures.tns](#)

Suggested Related Activities

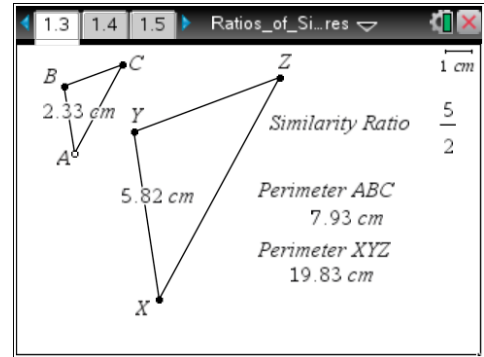
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- *Similarity and Dilations (TI-89 Titanium)* — 1288
- *Similar Figures – Using Ratios to Discover Properties (TI-Nspire technology)* — 9631
- *TAKS: Similar Figures and Proportions Using Cabri Jr. (TI-84 Plus Family)* — 9786

Problem 1 – Similar Triangles

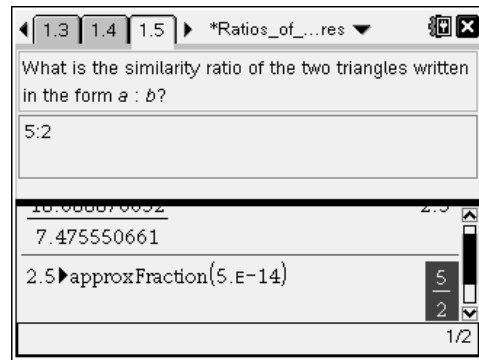
Students will begin this activity by looking at similar triangles. Students are given two triangles that are similar. They are also given the perimeter or area of the triangle. They will discover that the ratio of perimeters of similar figures is $a : b$ and the ratio of areas of similar figures is $a^2 : b^2$.

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
See Note 1 at the end of this lesson.

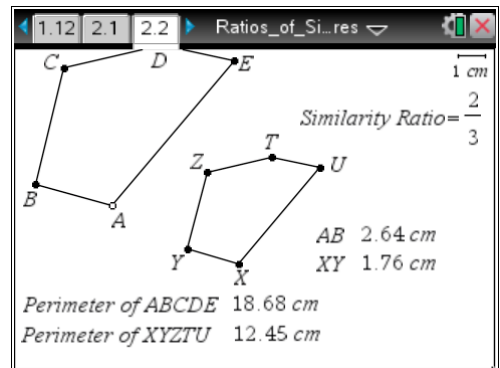
Students will need to use the calculator to find the ratios. They will need to use the **approxFraction** command (MENU > Number > Approximate to Fraction).



TI-Nspire Navigator Opportunity: Quick Poll
See Note 2 at the end of this lesson.

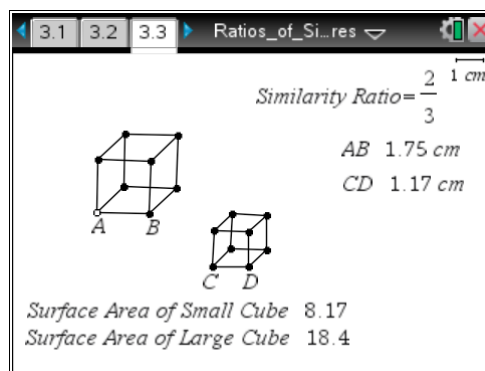
Problem 2 – Similar Figures

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



Problem 3 – Extension to Three-Dimensional Figures

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

**TI-Nspire Navigator Opportunities****Note 1: Screen Capture**

Here and throughout the lesson you can use screen capture to ensure students are able to move point A to manipulate the figures.

Note 2: 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 Triangle XYZ for different values of the perimeter of Triangle ABC.

Student Solutions

1. Sample answers

Position	AB	XY	Perimeter of XYZ	Perimeter of ABC	Ratio of Perimeters
1	2.38	5.94	20.05921937	8.023687748	2.5
2	2.24	5.60	18.457960113	7.383184045	2.5
3	3.06	7.66	23.409127949	9.36365118	2.5
4	2.56	6.41	22.452122348	8.980848939	2.5

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
1	2.41	6.02	15.46875	2.475	6.25
2	1.83	4.58	12.1875	1.95	6.25
3	3.16	7.9	20.2734375	3.24375	6.25
4	2.37	5.93	12.3046875	1.96875	6.25

6. 25 : 4

7. They are squares of the ratio of the triangles.

8. Sample answers

Position	AB	XY	Perimeter of XYZTU	Perimeter of ABCDE	Ratio of Perimeters
1	2.79732	1.86488	12.786902093	19.18035314	0.667
2	4.36177	2.97084	11.727024346	17.590536519	0.667
3	6.82807	4.55204	12.620326159	18.930489239	0.667
4	10.1541	6.76938	15.284831255	22.927246882	0.667

9. 2 : 3

10. 2 : 3

11. They are the same

12. Sample answers

Position	AB	XY	Area of XYZTU	Area of ABCDE	Ratio of Areas
1	2.79732	1.86488	9.552222222	21.4925	0.44444
2	2.06155	1.37437	8.931111111	20.095	0.44444
3	5.50273	3.66848	7.64	17.19	0.44444
4	9.77714	6.51809	8.361111111	18.8125	0.44444

13. 4 : 9

14. They are squares of the similarity ratio of the pentagons.

15. $a : b$

16. $a^2 : b^2$

17. Sample answers

Position	<i>AB</i>	<i>CD</i>	Surface Area of Small Cube	Surface Area of Large Cube	Ratio of Surface Areas
1	1.75071414	1.16714276	8.173333333	18.39	0.44444
2	2.122498528	1.414999018	12.013333333	27.03	0.44444
3	3.3	2.2	29.04	65.34	0.44444
4	.8	0.533333333	1.706666667	3.84	0.44444

18. 2 : 3

19. 4 : 9

20. They are squares of the similarity ratio of the sides of the cube.

21. Sample answers

Position	<i>AB</i>	<i>CD</i>	Volume of Small Cube	Volume of Large Cube	Ratio of Volumes
1	1.75071414	1.313035605	2.263755448	5.365938839	0.421875
2	2.650471656	1.987853742	7.855128303	18.619563384	0.421875
3	0.961769203	0.721326902	0.375315404	0.889636513	0.421875
4	4	3	27	64	0.421875

22. 27 : 64

23. They are cubes of the similarity ratio

24. $a^2 : b^2$

25. $a^3 : b^3$