Area Volume and Surface Area

Lesson 1 Triangle Areas by Decomposition

Standards 6.G.A.1

Learning target I can find the area of any triangle using a perpendicular height.

Materials Rulers, grid paper, unit cubes or paper cube models, paper and scissors for nets.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about triangle areas by decomposition. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: Sketch a triangle with base 12 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch perpendicular height, missing faces, and square versus cubic units.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

Area Volume and Surface Area

Lesson 1 Triangle Areas by Decomposition

Standards 6.G.A.1

Learning target I can find the area of any triangle using a perpendicular height.

Learn and Discuss

Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units.

Example 1 Sketch a triangle with base 4 cm and perpendicular height 4 cm. Find its area.
Solution 8 cm². A = bh/2 = 4 × 4 ÷ 2 = 8. Two such triangles make a parallelogram.
Example 2 Sketch a triangle with base 16 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.
Solution 24 cm². A = bh/2 = 16 × 3 ÷ 2 = 24. Two such triangles make a parallelogram.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Triangle Areas by Decomposition

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 6 cm and perpendicular height 2 cm. Find its area.

2. Sketch a triangle with base 12 cm and perpendicular height 6 cm. Find its area.

3. Sketch a triangle with base 10 cm and perpendicular height 3 cm. Find its area.

4. Sketch a triangle with base 4 cm and perpendicular height 5 cm. Find its area.

5. Sketch a triangle with base 4 cm and perpendicular height 2 cm. Find its area.

6. Sketch a triangle with base 14 cm and perpendicular height 6 cm. Find its area.

7. Sketch a triangle with base 6 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.

8. Sketch a triangle with base 4 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

9. Sketch a triangle with base 12 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

10. Sketch a triangle with base 12 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.

Triangle Areas by Decomposition

Area Volume and Surface Area

1. 6 cm²
Reasoning A = bh/2 = 6 × 2 ÷ 2 = 6. Two such triangles make a parallelogram.

2. 36 cm²
Reasoning A = bh/2 = 12 × 6 ÷ 2 = 36. Two such triangles make a parallelogram.

3. 15 cm²
Reasoning A = bh/2 = 10 × 3 ÷ 2 = 15. Two such triangles make a parallelogram.

4. 10 cm²
Reasoning A = bh/2 = 4 × 5 ÷ 2 = 10. Two such triangles make a parallelogram.

5. 4 cm²
Reasoning A = bh/2 = 4 × 2 ÷ 2 = 4. Two such triangles make a parallelogram.

6. 42 cm²
Reasoning A = bh/2 = 14 × 6 ÷ 2 = 42. Two such triangles make a parallelogram.

7. 9 cm²
Reasoning A = bh/2 = 6 × 3 ÷ 2 = 9. Two such triangles make a parallelogram.

8. 4 cm²
Reasoning A = bh/2 = 4 × 2 ÷ 2 = 4. Two such triangles make a parallelogram.

9. 12 cm²
Reasoning A = bh/2 = 12 × 2 ÷ 2 = 12. Two such triangles make a parallelogram.

10. 18 cm²
Reasoning A = bh/2 = 12 × 3 ÷ 2 = 18. Two such triangles make a parallelogram.