Area Volume and Surface Area

Lesson 11 Pyramid Nets and Surface Area

Standards 6.G.A.4

Learning target I can find pyramid surface area from its triangular faces and base.

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 pyramid nets and surface area. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. For a square pyramid, draw one square and four triangles. Each triangle has area base edge × face height / 2. The face height is measured on the triangular face, not vertically inside the solid. 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: A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 13 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height 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 _____

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Learn and Discuss

For a square pyramid, draw one square and four triangles. Each triangle has area base edge × face height / 2. The face height is measured on the triangular face, not vertically inside the solid.

Example 1 A square pyramid has base edge 16 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area.
Solution 576 cm². Base = 256; each triangle = 16 × 10 ÷ 2 = 80; add four triangles to get 576.
Example 2 A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.
Solution 144 cm². Base = 36; each triangle = 6 × 9 ÷ 2 = 27; add four triangles to get 144.

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

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Name _____ Show calculations, models, and units.

1. A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 5 cm. Draw a net and calculate total surface area.

2. A square pyramid has base edge 4 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area.

3. A square pyramid has base edge 4 cm. Each triangular face has perpendicular face height 6 cm. Draw a net and calculate total surface area.

4. A square pyramid has base edge 10 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area.

5. A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 13 cm. Draw a net and calculate total surface area.

6. A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area.

7. A square pyramid has base edge 12 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

8. A square pyramid has base edge 12 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

9. A square pyramid has base edge 10 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

10. A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 13 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

Pyramid Nets and Surface Area

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1. 96 cm²
Reasoning Base = 36; each triangle = 6 × 5 ÷ 2 = 15; add four triangles to get 96.

2. 80 cm²
Reasoning Base = 16; each triangle = 4 × 8 ÷ 2 = 16; add four triangles to get 80.

3. 64 cm²
Reasoning Base = 16; each triangle = 4 × 6 ÷ 2 = 12; add four triangles to get 64.

4. 280 cm²
Reasoning Base = 100; each triangle = 10 × 9 ÷ 2 = 45; add four triangles to get 280.

5. 560 cm²
Reasoning Base = 196; each triangle = 14 × 13 ÷ 2 = 91; add four triangles to get 560.

6. 132 cm²
Reasoning Base = 36; each triangle = 6 × 8 ÷ 2 = 24; add four triangles to get 132.

7. 336 cm²
Reasoning Base = 144; each triangle = 12 × 8 ÷ 2 = 48; add four triangles to get 336.

8. 360 cm²
Reasoning Base = 144; each triangle = 12 × 9 ÷ 2 = 54; add four triangles to get 360.

9. 300 cm²
Reasoning Base = 100; each triangle = 10 × 10 ÷ 2 = 50; add four triangles to get 300.

10. 560 cm²
Reasoning Base = 196; each triangle = 14 × 13 ÷ 2 = 91; add four triangles to get 560.