

Unfolding Solids: Nets and Surface Area

Grade 6 math · Worksheet Answer Key · Standards: 6.G.A.4

Each solution lists the faces, gives the area of every face and adds them. Check that the number of areas matches the number of faces, because a missing face is the most common error.

Standards: 6.G.A.4 · **Level:** Grade 6

Problem 1 Name the solid

The six faces are identical squares, so the net folds into a cube.

A cube with 6 faces

Problem 2 Surface area of a cube

One face is $7 \times 7 = 49$. The cube has 6 faces: $6 \times 49 = 294$.

294 square inches

Problem 3 Faces of a box net

Top and bottom: $6 \times 4 = 24$ each. Front and back: $6 \times 2 = 12$ each. Sides: $4 \times 2 = 8$ each. $SA = 2(24) + 2(12) + 2(8) = 48 + 24 + 16 = 88$.

88 square feet

Problem 4 Surface area of a box

$9 \times 3 = 27$, $9 \times 2 = 18$, $3 \times 2 = 6$. $SA = 2(27 + 18 + 6) = 2 \times 51 = 102$.

102 square centimeters

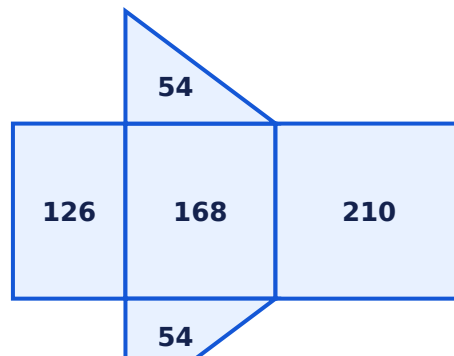
Problem 5 Parts of a triangular prism

Two faces are triangles and three faces are rectangles, so there are 5 faces. Count the edges: 3 on each triangle plus 3 joining them is 9 edges. There are 3 vertices on each triangle, so 6 vertices. Check: $6 - 9 + 5 = 2$.

2 triangles and 3 rectangles; 5 faces, 9 edges, 6 vertices

Problem 6 Triangular prism from a net

Triangles: $\frac{1}{2} \times 9 \times 12 = 54$ each, so 108 for both. Rectangles: $9 \times 14 = 126$, $12 \times 14 = 168$, $15 \times 14 = 210$, which total 504. $SA = 108 + 504 = 612$.



Face areas in square inches: 126, 168, 210, 54 and 54.

612 square inches

Problem 7 Pyramid with a decimal slant height

Base: $6 \times 6 = 36$. Each triangle: $\frac{1}{2} \times 6 \times 8.5 = 25.5$. Four triangles: $4 \times 25.5 = 102$. Total: $36 + 102 = 138$.

138 square meters

Problem 8 Cube with a decimal edge

One face is $3.5 \times 3.5 = 12.25$. Six faces: $6 \times 12.25 = 73.5$.

73.5 square meters

Problem 9 Missing height from surface area

$220 = 2(10 \times 4) + 2(10h) + 2(4h) = 80 + 28h$. Then $28h = 140$, so $h = 5$. Check: $2(40 + 50 + 20) = 220$.

5 inches

Problem 10 Open-top terrarium

Bottom: $15 \times 9 = 135$. Two long sides: $2 \times (15 \times 10) = 300$. Two short sides: $2 \times (9 \times 10) = 180$. Total: $135 + 300 + 180 = 615$.

615 square inches

Problem 11 Carton from a net

$2(9 \times 6) = 108$, $2(9 \times 4) = 72$, $2(6 \times 4) = 48$. $SA = 108 + 72 + 48 = 228$.

228 square inches

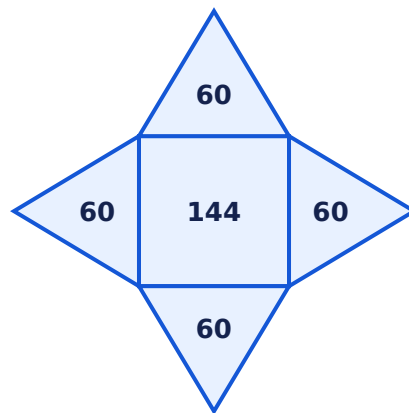
Problem 12 Camping tent

Floor: $6 \times 9 = 54$. Slanted sides: $2 \times (5 \times 9) = 90$. Triangular ends: $2 \times (\frac{1}{2} \times 6 \times 4) = 2 \times 12 = 24$. Total: $54 + 90 + 24 = 168$.

168 square feet

Problem 13 Square pyramid from a net

Base: $12 \times 12 = 144$. Each triangle: $\frac{1}{2} \times 12 \times 10 = 60$, so four triangles give 240. Total: $144 + 240 = 384$.



Face areas in square inches: base 144 and four triangles of 60.

384 square inches

Problem 14 Which box needs more paper?

Box A: $2(60) + 2(40) + 2(24) = 120 + 80 + 48 = 248$. Box B: $2(64) + 2(32) + 2(32) = 128 + 64 + 64 = 256$. The difference is $256 - 248 = 8$.

Box B has the greater surface area, by 8 square inches

Problem 15 Wrapping a gift

- a. $2(14 \times 10) + 2(14 \times 6) + 2(10 \times 6) = 280 + 168 + 120 = 568$.
- b. $568 \div 400 = 1.42$, so 2 sheets are needed.
- c. $2 \times 2.75 = 5.50$.

(a) 568 square inches; (b) 2 sheets; (c) \$5.50

Problem 16 Painting a shed

- a. Walls: $2(12 \times 7) + 2(8 \times 7) = 168 + 112 = 280$. Roof: $12 \times 8 = 96$. Total: 376.
- b. $376 \div 100 = 3.76$, so 4 gallons.
- c. $4 \times 27.50 = 110$.

(a) 376 square feet; (b) 4 gallons; (c) \$110

Problem 17 Candy box

Triangles: $2 \times (\frac{1}{2} \times 8 \times 15) = 2 \times 60 = 120$. Rectangles share the length 20: $(8 + 15 + 17) \times 20 = 40 \times 20 = 800$. Total: $120 + 800 = 920$.

920 square centimeters

Problem 18 Gazebo roof

Each triangle: $\frac{1}{2} \times 10 \times 8 = 40$. Four triangles: $4 \times 40 = 160$. Cost: $160 \times 2.40 = 384$.

\$384

Problem 19 Painting a planter

- a. One face is 6.25 square feet. Five faces: $5 \times 6.25 = 31.25$ for the outside, and 31.25 for the inside. Total: 62.5.
- b. $62.5 \div 25 = 2.5$, so 3 pints.

(a) 62.5 square feet; (b) 3 pints

Problem 20 Same volume, different surface

Cube: $6 \times 4 \times 4 = 96$. Box: $2(8 \times 4) + 2(8 \times 2) + 2(4 \times 2) = 64 + 32 + 16 = 112$. The difference is $112 - 96 = 16$.

Cube 96 square inches; box 112 square inches; the box is greater by 16 square inches