

Grade 7 - Cross-Sections of Three-Dimensional Figures - Answer Key

Common Core 7.G.A.3 · maths-pdf.fr/en/

Use this answer key to check your work on the cross-sections worksheet. Every solution shows the steps, and the final answer appears in bold. If your answer is different, compare each step and look for the first place where the work changes.

Grade 7 · Common Core State Standards: **7.G.A.3**

Exercise 1 - Slice parallel to the base

A cut parallel to the base is congruent to the base: a rectangle 8 in by 5 in.

$$8 \times 5 = 40$$

Rectangle; 40 square inches

Exercise 2 - Vertical slice (front)

The cross-section matches the front face: 10 ft by 4 ft.

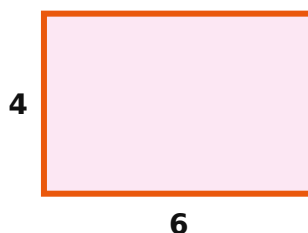
$$10 \times 4 = 40$$

Rectangle; 40 square feet

Exercise 3 - Vertical slice (side)

$$6 \times 4 = 24$$

24 square feet



A 6-by-4 rectangle.

Exercise 4 - Slice of a cube

Each face is a square 6 cm by 6 cm.

$$6 \times 6 = 36$$

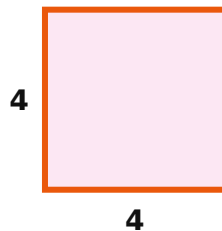
Square; 36 square centimeters

Exercise 5 - Halfway up a pyramid

The cut is halfway up, so each side is half of 8: 4 in.

$$4 \times 4 = 16$$

Square with side 4 in; 16 square inches



A 4-by-4 square.

Exercise 6 - Through the apex

The cross-section is a triangle with base 8 in and height 12 in.

$$A = \frac{1}{2} \times 8 \times 12 = 48$$

Triangle; 48 square inches

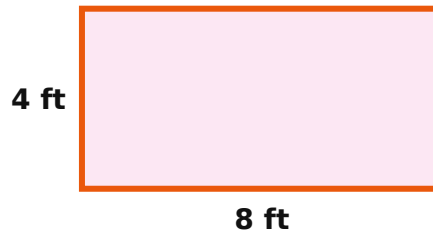
Exercise 7 - One third of the way up

The cut is $\frac{9-3}{9} = \frac{2}{3}$ of the way to the apex in size.

Dimensions: $\frac{2}{3} \times 12 = 8$ ft by $\frac{2}{3} \times 6 = 4$ ft.

$$8 \times 4 = 32$$

Rectangle 8 ft by 4 ft; 32 square feet



An 8-by-4 rectangle.

Exercise 8 - Corner cut

The plane meets three faces, so the cross-section has three sides.

Triangle

Exercise 9 - Name the shape

The plane meets the front, back, top, and bottom, so the cross-section has four sides, all at right angles.

A rectangle

Exercise 10 - Perimeter of a slice

The cross-section is a 12-by-8 rectangle.

$$2(12+8)=40$$

40 inches

Exercise 11 - Cheese slices

Each cut is a 10-by-6 rectangle (area 60 sq in).

Thickness: $4 \div 4 = 1$ in.

Volume: $60 \times 1 = 60$ cubic inches.

Rectangle 10 in by 6 in; 1 in thick; 60 cubic inches

Exercise 12 - Cake cut

The cut face is 12 in by 3 in.

$$12 \times 3 = 36$$

36 square inches

Exercise 13 - Pyramid roof

Fraction of the base: $\frac{9-3}{9} = \frac{2}{3}$.

Side: $\frac{2}{3} \times 24 = 16$ ft; area $16^2 = 256$

16 ft; 256 square feet

Height	Side	Area
0 (base)	24 ft	576
3 ft	16 ft	256
9 ft (apex)	0	0

Cross-sections at different heights.

Exercise 14 - Bread loaf

Each slice is a 3-by-5 rectangle: $3 \times 5 = 15$ square inches.

$$15 \div \frac{3}{4} = 15 \times \frac{4}{3} = 20$$

Rectangle, 15 sq in; 20 slices

Exercise 15 - Area ratio

Each side is half as long, so the area is $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$ of the base area.

One fourth

Exercise 16 - Aquarium water

The surface is a cross-section parallel to the base: 24 in by 12 in, area 288 square inches.

Volume: $288 \times 10 = 2880$

288 square inches; 2,880 cubic inches

Exercise 17 - Wood block

Cross-section: $6 \times 4 = 24$ square inches.

Volume: $24 \times 3 = 72$ cubic inches.

24 square inches; 72 cubic inches

Exercise 18 - Ice sculpture

At 5 in: $\frac{15-5}{15} \times 10 = \frac{20}{3} = 6\frac{2}{3}$ in.

At 10 in: $\frac{15-10}{15} \times 10 = \frac{10}{3} = 3\frac{1}{3}$ in.

$6\frac{2}{3}$ in and $3\frac{1}{3}$ in

Exercise 19 - Compare solids

Prism: the cross-section is congruent to the base, $6 \times 6 = 36$ square inches.

Pyramid: the cut is halfway up, so the side is 3 in and the area is $3 \times 3 = 9$ square inches.

Prism 36 sq in; pyramid 9 sq in

Exercise 20 - Layered box

Each cut is a 30-by-24 rectangle: $30 \times 24 = 720$ square inches.

Thickness: $12 \div 3 = 4$ in.

Volume: $720 \times 4 = 2880$ cubic inches.

720 square inches; 4 in; 2,880 cubic inches