Cross Sections of 3D Figures

Name: _____	Date: _____	Score: _____ / 24

Quick Review

A **cross section** is the flat, two-dimensional shape you see when you slice straight through a solid. The shape depends on *what* you slice and *which way*. A **horizontal** slice (parallel to the base) usually matches the base: slicing a cylinder gives a *circle*, slicing a rectangular prism gives a *rectangle*. A **vertical** slice can give a different shape: a vertical cut through a cylinder gives a *rectangle*, and a vertical cut through a cone (through the tip) gives a *triangle*. Picture the knife and follow the edges it crosses.

◇ **Example:** What shape is formed by a horizontal cross section of a cylinder?

⇒ Picture a soup can standing upright. A horizontal slice is parallel to the circular top and bottom. As the knife passes through, it traces the same round shape as the base all the way across. So a horizontal cross section of a cylinder is a *circle* — the same size as the base.

Answer: a circle

PRACTICE

Name the cross-section shape for each slice.

1. Horizontal slice of a cylinder _____
2. Vertical slice of a cylinder (through the center) _____
3. Horizontal slice of a rectangular prism _____
4. Vertical slice of a rectangular prism _____
5. Horizontal slice of a cube _____
6. Horizontal slice of a cone _____
7. Vertical slice of a cone through the tip _____
8. Any slice of a sphere _____
9. Horizontal slice of a square pyramid _____
10. Vertical slice of a square pyramid through the tip _____
11. Horizontal slice of a triangular prism _____
12. Vertical slice of a triangular prism (parallel to base) _____
13. Slice of a cylinder at a slight angle _____
14. Horizontal slice of a hexagonal prism _____
15. Cross section that matches a solid's base is from a _____ slice _____
16. Vertical slice of a cube _____
17. Horizontal slice of a sphere through the center _____
18. Vertical slice of a cone NOT through the tip _____
19. Slice of a rectangular prism parallel to a face _____
20. Horizontal slice of a pentagonal pyramid _____

♦ Word Problems

21. A baker slices a cylindrical cake straight down through the center, from top to bottom. What two-dimensional shape is the freshly cut face? _____

22. An architect slices a model of a square-based pyramid horizontally, partway up. What shape is the cross section, and how does its size compare to the base? _____

23. A geologist cuts a spherical rock sample with a flat saw. No matter where the cut is made, what shape will every cross section be? _____

24. A chef cuts an ice cream cone straight down through its pointed tip. What shape is the cross section? _____

Answer Keys

1. circle
2. rectangle
3. rectangle
4. rectangle
5. square
6. circle
7. triangle
8. circle
9. square
10. triangle
11. triangle
12. rectangle
13. ellipse
14. hexagon
15. horizontal
16. square
17. circle
18. not a triangle
19. rectangle
20. pentagon
21. a rectangle
22. a square, smaller than the base
23. a circle
24. a triangle

Step-by-Step Explanations

1. A horizontal slice matches the round base.
2. A vertical cut through a cylinder gives a rectangle.
3. A horizontal slice matches the rectangular base.
4. A straight vertical cut still gives a rectangle.
5. A cube's horizontal slice matches the square base.
6. A horizontal slice of a cone gives a (smaller) circle.
7. Cutting straight down through the apex gives a triangle.
8. Every flat slice of a sphere is a circle.
9. A horizontal slice matches the square base shape.
10. Cutting down through the apex gives a triangle.
11. A horizontal slice matches the triangular base.
12. Cutting parallel to the rectangular side gives a rectangle.
13. An angled (non-horizontal, non-vertical) cut gives an ellipse.
14. A horizontal slice matches the hexagonal base.
15. A horizontal slice is parallel to and matches the base.
16. A vertical cut through a cube gives a square (or rectangle) face.
17. The widest slice of a sphere is its great-circle circle.
18. Missing the apex, the cut is a curved shape, not a triangle.
19. Any cut parallel to a face copies that rectangular face.
20. A horizontal slice of a pentagonal pyramid is a pentagon.
21. A vertical slice through the center of a cylinder cuts through the straight sides and flat top and bottom, producing a rectangle.
22. A horizontal slice of a square pyramid is a square shaped like the base, but smaller because the pyramid narrows toward the top.
23. Every flat slice of a sphere produces a circle; slices closer to the center make larger circles.
24. A vertical slice through the apex of a cone passes through the tip and across the circular base, forming a triangle.

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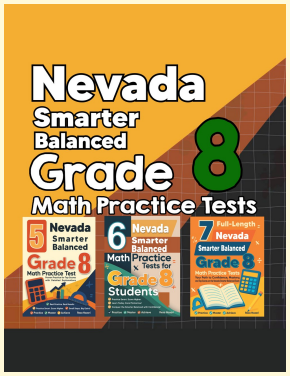

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