

Cross Sections of 3D Figures

Name: _____ Date: _____ Score: _____ / 24

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

◆ Word Problems

- A baker slices a cylindrical cake straight down through the center, from top to bottom. What two-dimensional shape is the freshly cut face? _____
- 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? _____
- 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? _____
- A chef cuts an ice cream cone straight down through its pointed tip. What shape is the cross section? _____



Answer Keys

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. <input type="text" value="circle"/> 2. <input type="text" value="rectangle"/> 3. <input type="text" value="rectangle"/> 4. <input type="text" value="rectangle"/> 5. <input type="text" value="square"/> 6. <input type="text" value="circle"/> 7. <input type="text" value="triangle"/> 8. <input type="text" value="circle"/> 9. <input type="text" value="square"/> 10. <input type="text" value="triangle"/> 11. <input type="text" value="triangle"/> 12. <input type="text" value="rectangle"/> | <ol style="list-style-type: none"> 13. <input type="text" value="ellipse"/> 14. <input type="text" value="hexagon"/> 15. <input type="text" value="horizontal"/> 16. <input type="text" value="square"/> 17. <input type="text" value="circle"/> 18. <input type="text" value="not a triangle"/> 19. <input type="text" value="rectangle"/> 20. <input type="text" value="pentagon"/> 21. <input type="text" value="a rectangle"/> 22. <input type="text" value="a square, smaller than the base"/> 23. <input type="text" value="a circle"/> 24. <input type="text" value="a triangle"/> |
|---|---|

Step-by-Step Explanations

- | | |
|--|--|
| <ol style="list-style-type: none"> 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. | <ol style="list-style-type: none"> 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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