

# 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

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

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. A horizontal slice matches the round base.</li> <li>2. A vertical cut through a cylinder gives a rectangle.</li> <li>3. A horizontal slice matches the rectangular base.</li> <li>4. A straight vertical cut still gives a rectangle.</li> <li>5. A cube's horizontal slice matches the square base.</li> <li>6. A horizontal slice of a cone gives a (smaller) circle.</li> <li>7. Cutting straight down through the apex gives a triangle.</li> <li>8. Every flat slice of a sphere is a circle.</li> <li>9. A horizontal slice matches the square base shape.</li> <li>10. Cutting down through the apex gives a triangle.</li> <li>11. A horizontal slice matches the triangular base.</li> <li>12. Cutting parallel to the rectangular side gives a rectangle.</li> <li>13. An angled (non-horizontal, non-vertical) cut gives an ellipse.</li> <li>14. A horizontal slice matches the hexagonal base.</li> </ol> | <ol style="list-style-type: none"> <li>15. A horizontal slice is parallel to and matches the base.</li> <li>16. A vertical cut through a cube gives a square (or rectangle) face.</li> <li>17. The widest slice of a sphere is its great-circle circle.</li> <li>18. Missing the apex, the cut is a curved shape, not a triangle.</li> <li>19. Any cut parallel to a face copies that rectangular face.</li> <li>20. A horizontal slice of a pentagonal pyramid is a pentagon.</li> <li>21. A vertical slice through the center of a cylinder cuts through the straight sides and flat top and bottom, producing a rectangle.</li> <li>22. A horizontal slice of a square pyramid is a square shaped like the base, but smaller because the pyramid narrows toward the top.</li> <li>23. Every flat slice of a sphere produces a circle; slices closer to the center make larger circles.</li> <li>24. A vertical slice through the apex of a cone passes through the tip and across the circular base, forming a triangle.</li> </ol> |
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