

The Geometry Study Guide



This is a **two-part study guide**. The first part is **classification geometry** – the geometry of classifying polygons and polyhedra, and part two is **general geometry questions**.



THE UPCOMING EXAM IS THE GEOMETRY UNIT TEST. IT INCLUDES:

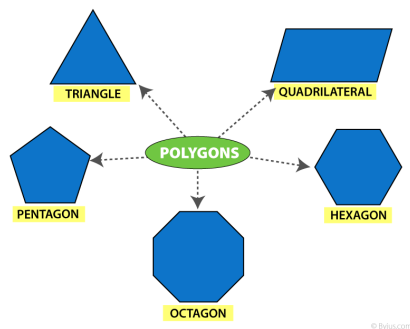

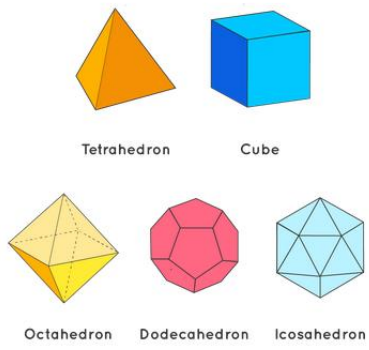
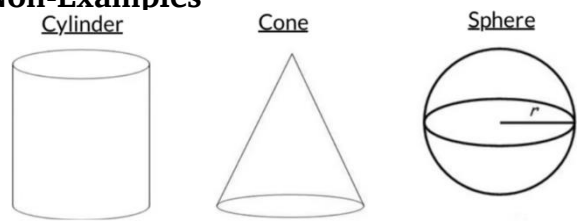
AREA & PERIMETER WITH FRACTIONS & DECIMALS, VOLUME, AND CLASSIFICATION.

If you feel like you need additional practice, please go back through your homework and previous study guides. These are entirely examples of what the upcoming test will be like, and what you should study. Remember: your weekly homework also has additional practice IXLs.

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CLASSIFICATION GEOMETRY

First thing's first: the difference between polyhedra and polygons. Remember the following rules for both to be polyhedra or polygons:

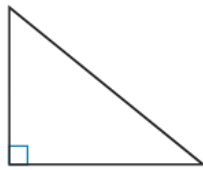
POLYGON	POLYHEDRON
<ul style="list-style-type: none"> • Closed Figure (No openings; all lines connect). 	<ul style="list-style-type: none"> • Made of Polygons (therefore, is closed as well).
<ul style="list-style-type: none"> • NO Curves – straight lines only. 	<ul style="list-style-type: none"> • NO curved surfaces.
<ul style="list-style-type: none"> • 2D / 2-Dimensional – It is flat. 	<ul style="list-style-type: none"> • 3D / 3-Dimensional – It is a solid figure like what we experience in real life.
<p>Examples:</p>  <p style="text-align: right; font-size: small;">© Byjus.com</p> <p>Non-Examples</p>  <p>Curved. Opened (Not Closed) 3-D</p>	<p>Examples:</p>  <p style="text-align: center;">Tetrahedron Cube Octahedron Dodecahedron Icosahedron</p> <p>Non-Examples</p>  <p style="text-align: center;">Cylinder Cone Sphere</p> <p style="text-align: center; color: red; font-weight: bold; font-size: 1.2em;">You must know these names!</p>

In addition to this, you must be able to classify **triangles** (3-sided polygons) and **quadrilaterals** (4-sided polygons). You must meet **all** the requirements to classify a figure.

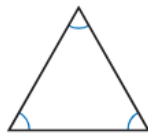
For triangles, remember that the full name is **always** written like this:

(Angle-Type) + (Sides-Type) + “Triangle”

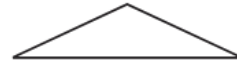
First, the angle types:



Right triangle
1 right angle

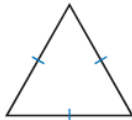


Acute triangle
3 acute angles

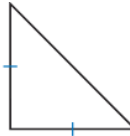


Obtuse triangle
1 obtuse angle

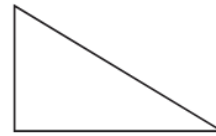
Then, the side-types (note the equality):



Equilateral triangle
3 sides of equal length

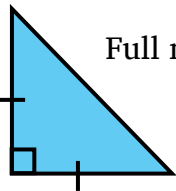


Isosceles triangle
2 sides of equal length



Scalene triangle
3 different side lengths

Examples:

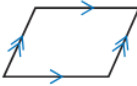

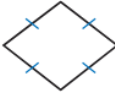

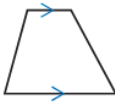


Full name: Right (Right Angle) Isosceles (Two Equal Sides) Triangle.



Full name: Obtuse (1 obtuse angle) Scalene (no equal sides) Triangle.

Additionally, you must know the qualities of **all quadrilaterals**:

Quadrilateral	Attributes	Example
Parallelogram	Two pairs of parallel sides and opposite sides of the same length	
Rectangle	2 pairs of parallel sides, 4 right angles, and opposite sides of the same length	
Rhombus	Two pairs of parallel sides and 4 of the same length	
Square	2 pairs of parallel sides, 4 right angles, and 4 of the same length	
Trapezoid	At least 1 pair of parallel sides.	

Questions you might receive for these relate to **meeting qualities**.

For example:

(Q) Is a square always a parallelogram?

(A) Yes, because a square always has two pairs of parallel sides.

(Q) Is a trapezoid always a rhombus?

(A) No, because trapezoid does not need to have all equal sides (because rhombuses must have all equal sides).

Unfortunately, there is no easy way around this – **you must memorize the properties of these shapes!** Most of them should be familiar to you (squares, rectangles, quadrilateral), but newer ones (trapezoid, rhombus, parallelogram) must be learned.

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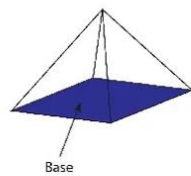
Finally, for polyhedra, you must be able to identify the difference between a **prism** and a **pyramid**.

For prisms, remember this rhyme: “**Two equal bases, lateral faces.**”

For pyramids, **look for the apex**. The **apex** is the pointy tip that all sides meet at.

Pyramid

- 1 base
- Triangular faces meet at one vertex



Vertex
The point where two or more edges meet.

Edge
A line formed by two faces.

Prism

- 2 congruent bases
- Rectangular side faces



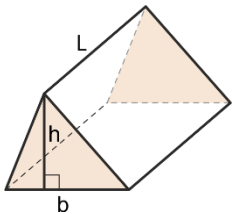
Congruent bases



Face
A flat surface.

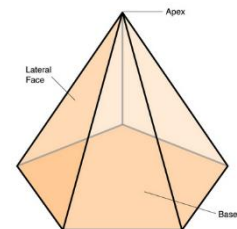
Rectangular side face

Importantly, you must be able to **name a polyhedron**. The **full name** of a polyhedron is: **The Base Shape + (Prism OR Pyramid)**.

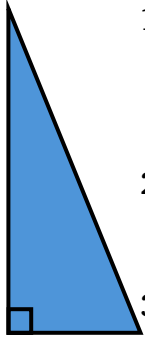


LEFT: Triangular prism. **Why?** 1. Two equal bases (triangles), lateral faces (rectangular side faces).

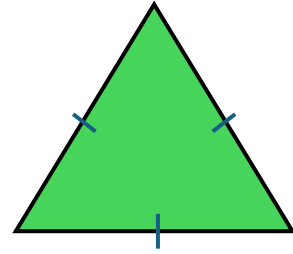
RIGHT: Pentagonal Pyramid. **Why?** 1. One base (a pentagon), 2. It has an apex (the single point the sides meet at).



Now let's practice. Go to the next page. ■



1. Provide the full name of the green figure on the right:



2. Provide the full name of the blue figure on the left:

3. Provide the full name of the orange figure on the below:



4. A triangle has the following measurements:

Sides: 6 in, 6 in, 6 in.

Angles: 60° , 60° , 60° .

What is its full name?

5. A triangle has the following moments:

Sides: 5 cm, 13.6 cm, 16.7 cm.

Angles: 120° , 45° , 15° .

What is its full name?

6. A triangle has the following measurements:

Sides: 8 ft, 8ft, 10.2ft.

Angles: 80° , 50° , 50° .

What is its full name?

7. Is a rectangle always a square? Why?

8. Is a trapezoid always a quadrilateral? Why?

9. Are all parallelograms also trapezoids? Why?

10. Are all rhombuses also squares? Why?

11. Lucas is using a program to draw shapes. He draws a 4-sided figure, with only 1 pair of parallel sides. He has created a: _____.

12. Mayra is creating an art piece using abstract shapes. In the center is a 4-sided figure with two pairs of parallel sides, all equal sides, but no right angles. Mayra has drawn a: _____.

13. Seiji is creating an arrowhead for a project. The arrowhead has 3 sides, two of which are equal, with angles that are all **less** than 90 degrees. Seiji's arrowhead is an example of a(n): _____.

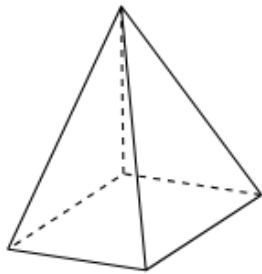
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Provide the name (full, if applicable) of **each** polyhedron below.

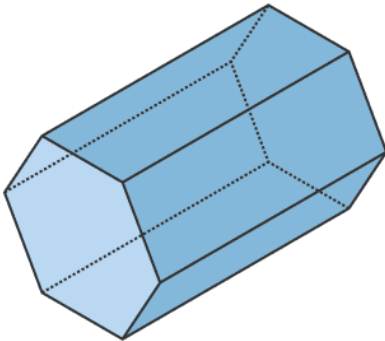
14. _____



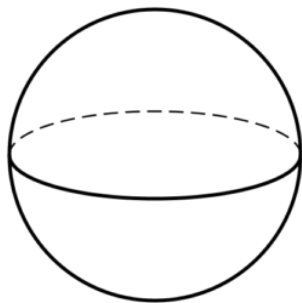
15. _____



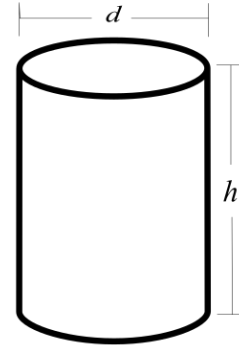
16. _____



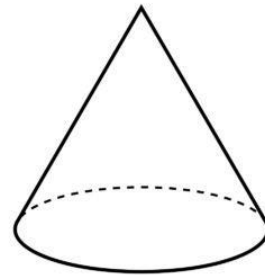
17. _____



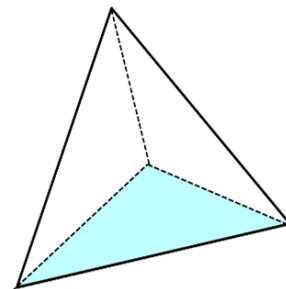
18. _____



19. _____



20. _____



Part Two: General Geometry Questions:

21. Find the area **and** perimeter of the figure below.



$$w = 2\frac{1}{8}$$

$$l = 4\frac{2}{5}$$

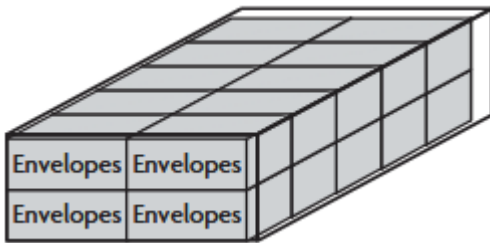
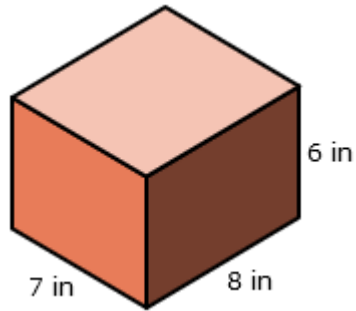
22. Find the area **and** perimeter of the figure on the right.



$$w = 1.8$$

$$l = 7.5$$

23. Find the volume of the figure below.



24. On the left is an example of a shipping crate full of envelope boxes. If **each** envelope box has a volume of 120 in^3 , then what is the **total volume** of the shipping container?

25. Find the volume of the compound figure in the image below.

