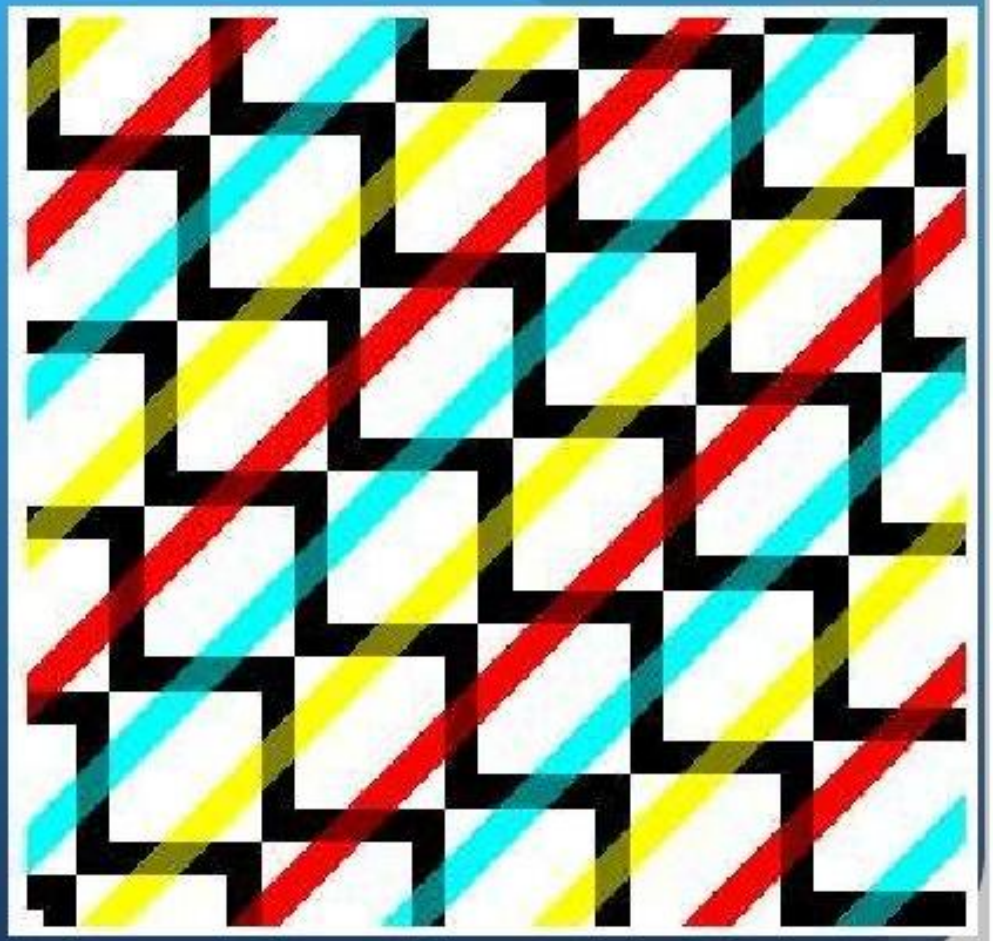
THE BASICS OF GEOMETRY

Basic Concepts of Lines, Rays, and Angles.

Lines!

- Different Types:
  - Line
  - Line Segment
  - Ray
  - Perpendicular
  - Parallel
  - Intersecting



Line

- Has no beginning or end.
- Continues indefinitely in both directions.
- Can be illustrated by drawing arrows at each end.

Line Segment

- Has a beginning point and an end point.
- Line segments on a shape are called sides.
- Can be found in many shapes.

Ray

- Has a beginning point but no end point.

Parallel

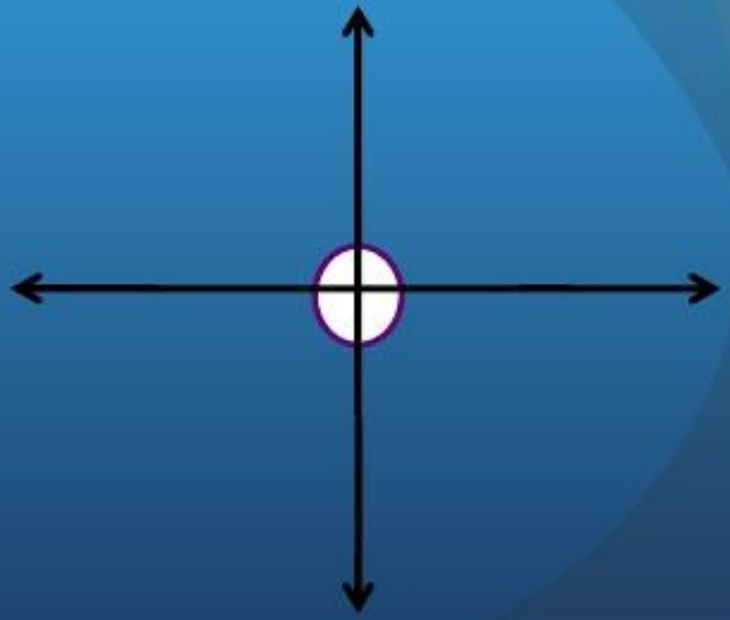
- Lines in the same plane that do not intersect or cross each other.

Intersecting

- Two or more lines that meet at a point.

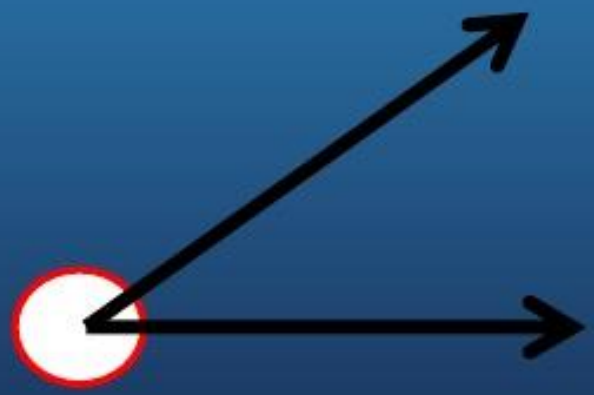
Perpendicular

- Perpendicular lines form a right or 90 degree angle.



Angles

- Made up of two rays with the same start point.
- The start point is called the vertex.
- The two rays are called the sides of the angle.



Different Angles

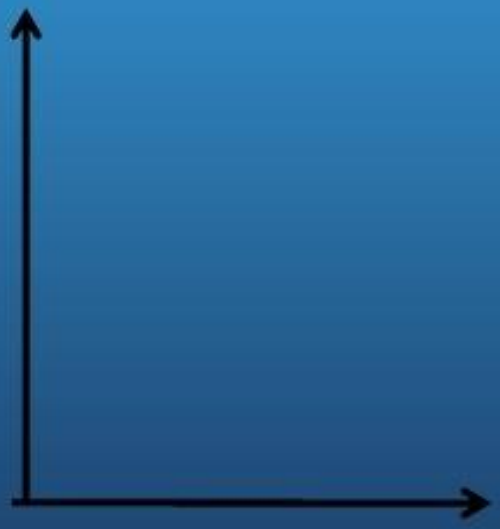
- Zero Angles
- Right Angles
- Acute Angles
- Obtuse Angles
- Straight Angles
- Supplementary Angles
- Complimentary Angles

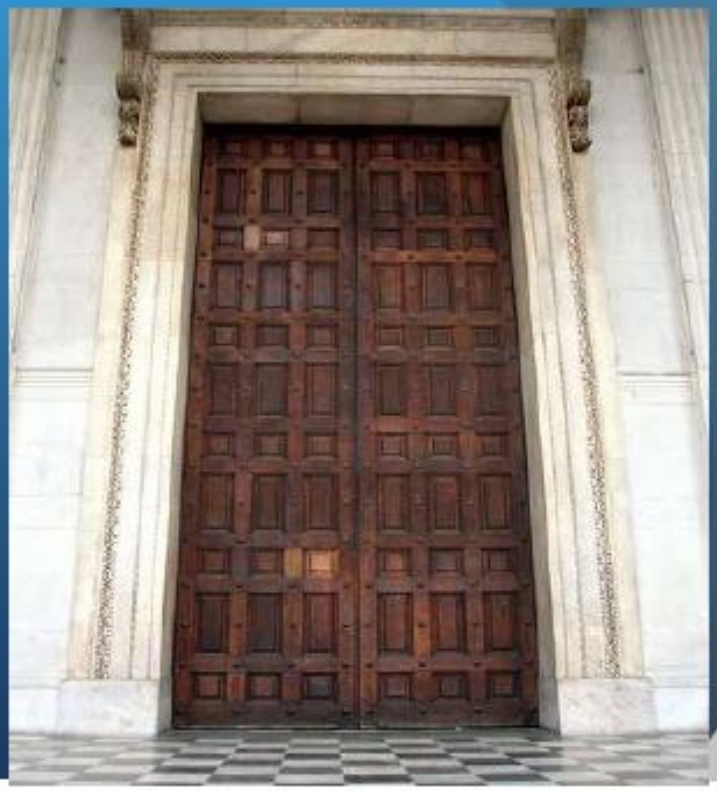
Zero Angles

- Are Parallel and equal 180 degrees.

Right Angle

- Two rays that create a 90 degree angle.





Acute Angle

- Two rays that have a smaller angle than a right angle.
- <90 Degrees

Obtuse Angle

- Angles larger than a right angle and smaller than two right angles. >90 Degrees

Straight Angle

- Angles equal to two right angles.

Supplementary Angles

- Two angles that sum to a straight angle

Complimentary Angles

- Two angles that sum to one right angle

Shapes and Forms

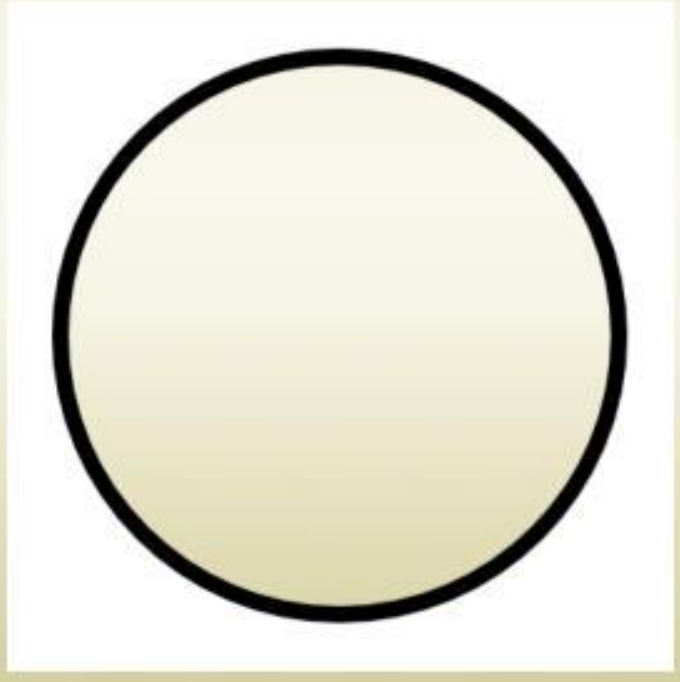
Plane Figures

What are shapes?

- Shapes are outline figures, mostly with edges

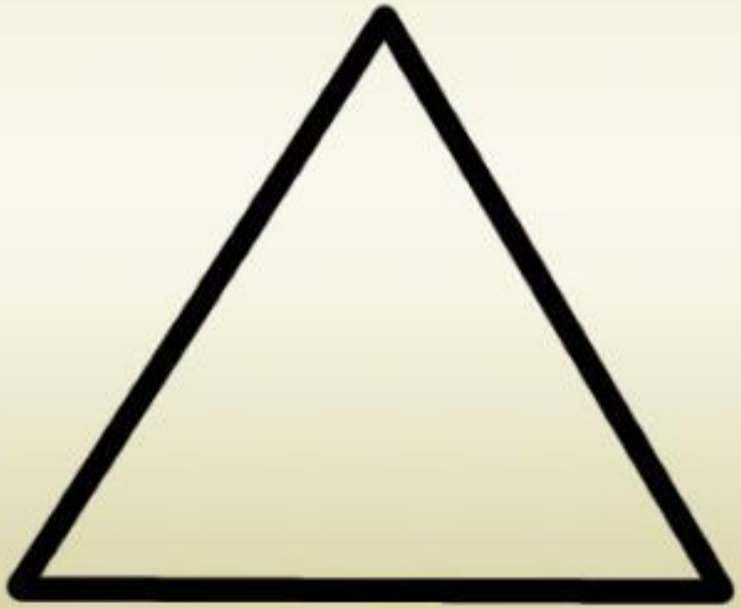
Circles

- 1 sided shape with no corners



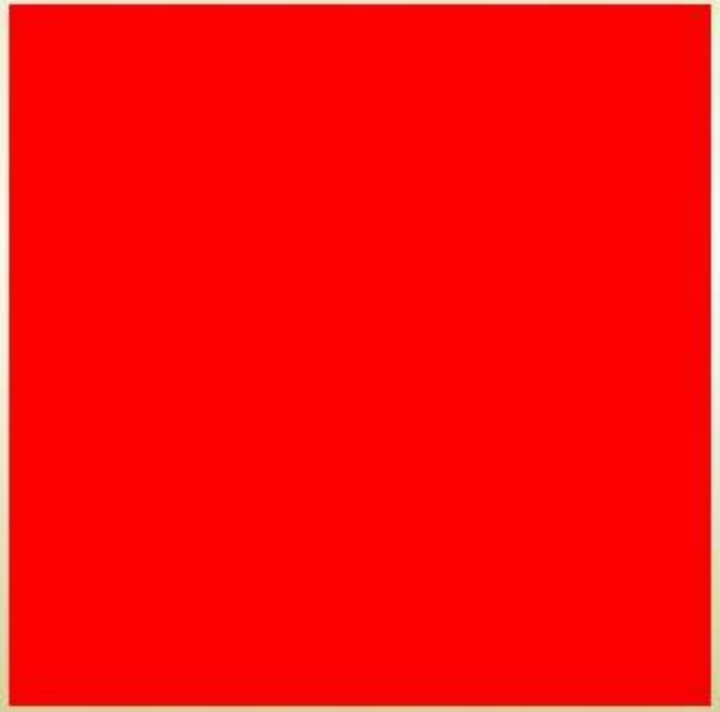
Triangle

- 3 sided shape with 3 corners



Square

- Squares are 4 sides

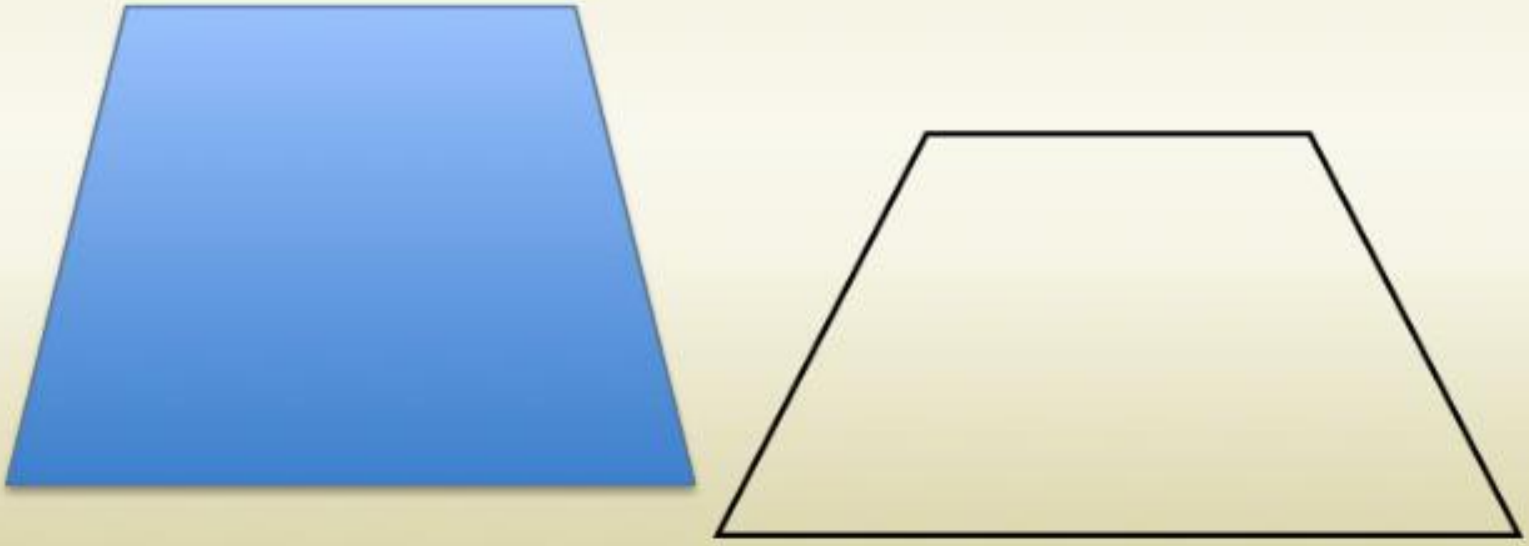


Rectangle

- Rectangles has 4 sides, two sides are longer then the other.

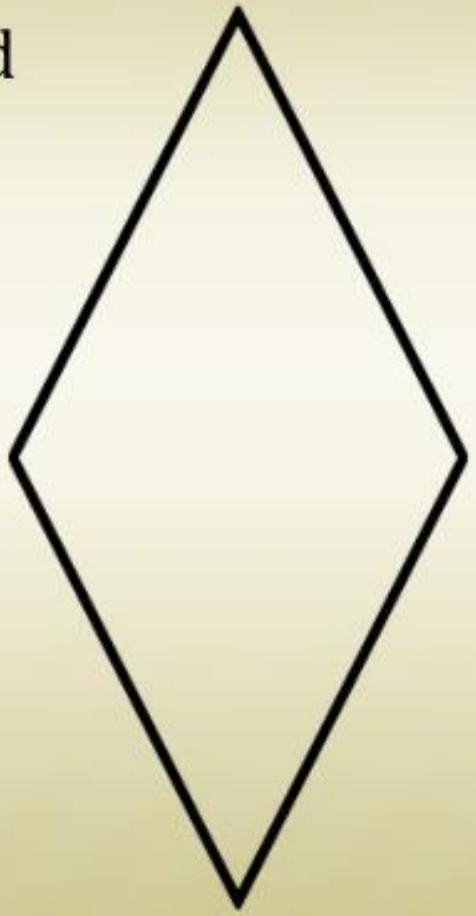
Trapezoid

- Trapezoid has two same lines



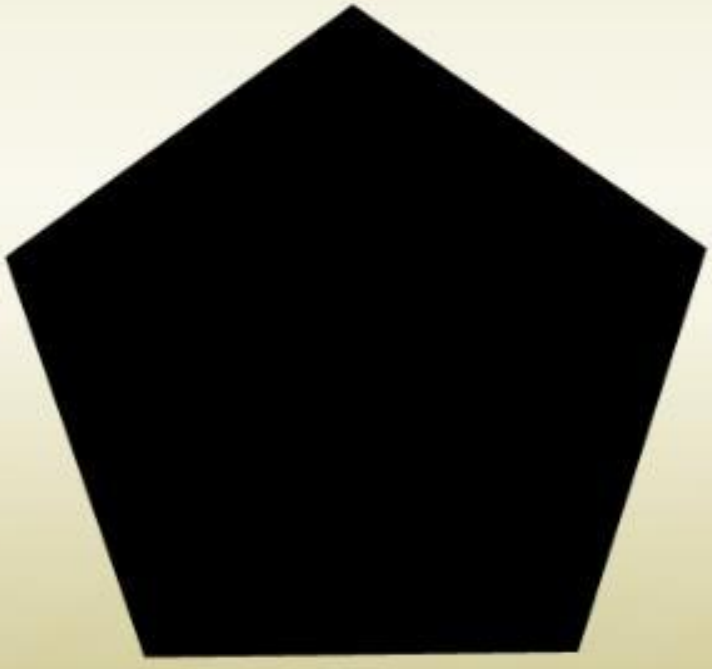
Rhombus

- Rhombus are also called Diamond



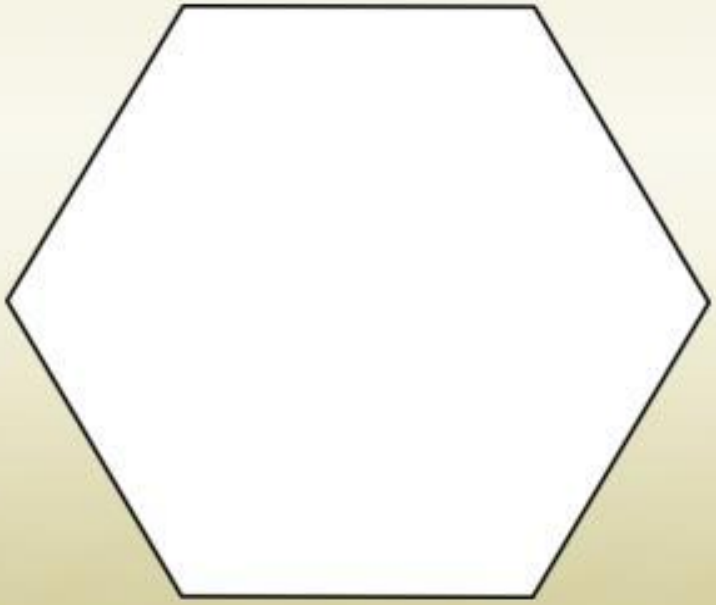
Pentagon

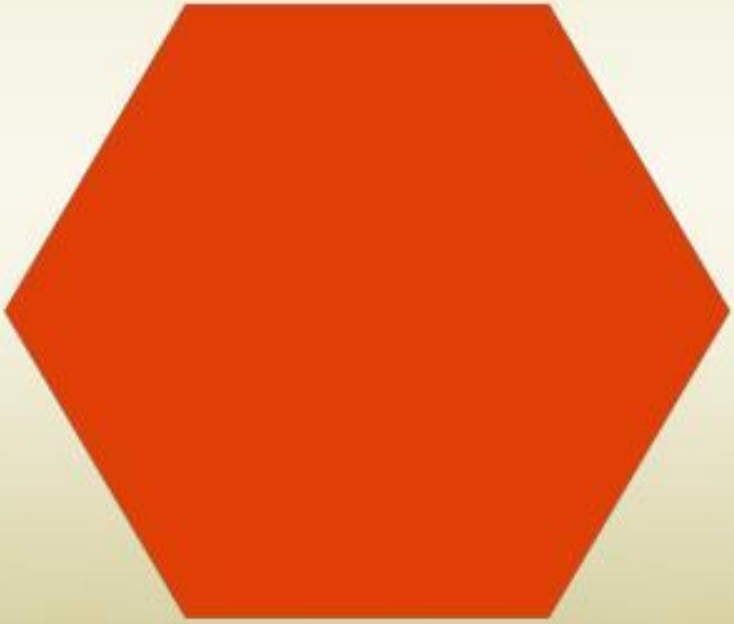
- Pentagons are 5 side shapes



Hexagon

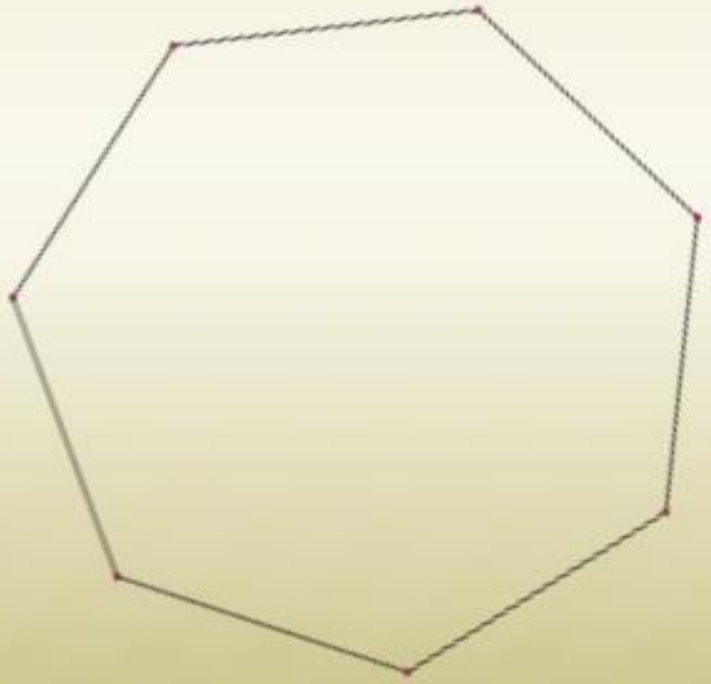
- Hexagons are 6 sided shapes

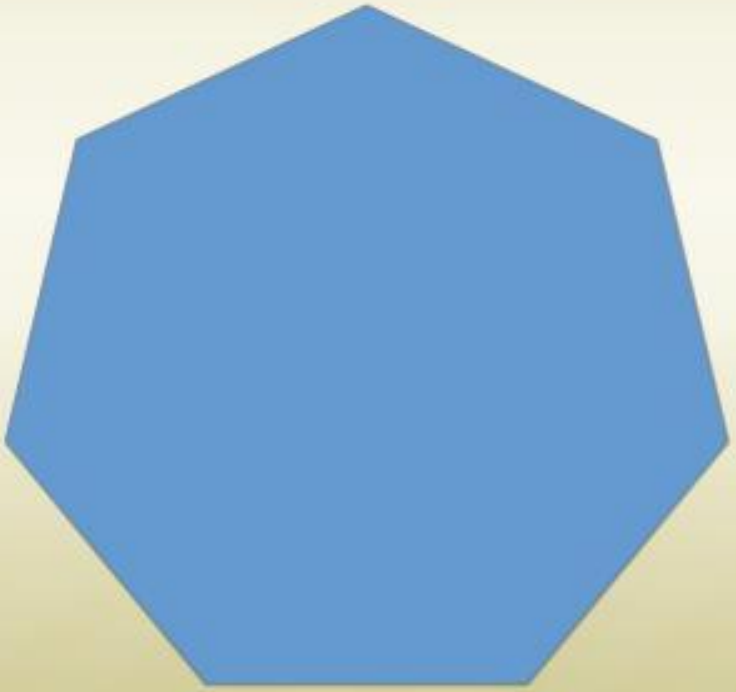




Heptagon

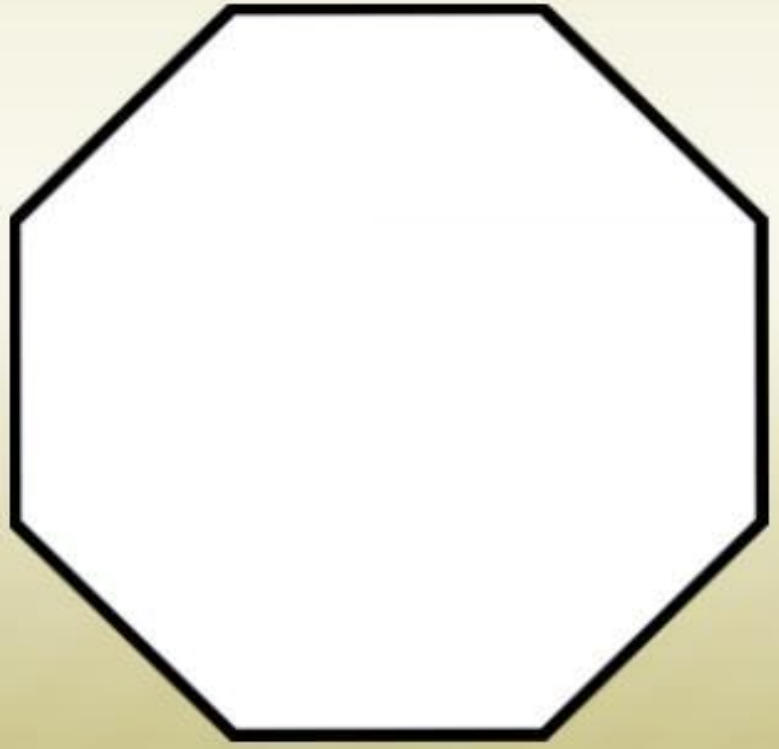
- Heptagons have 7 sides

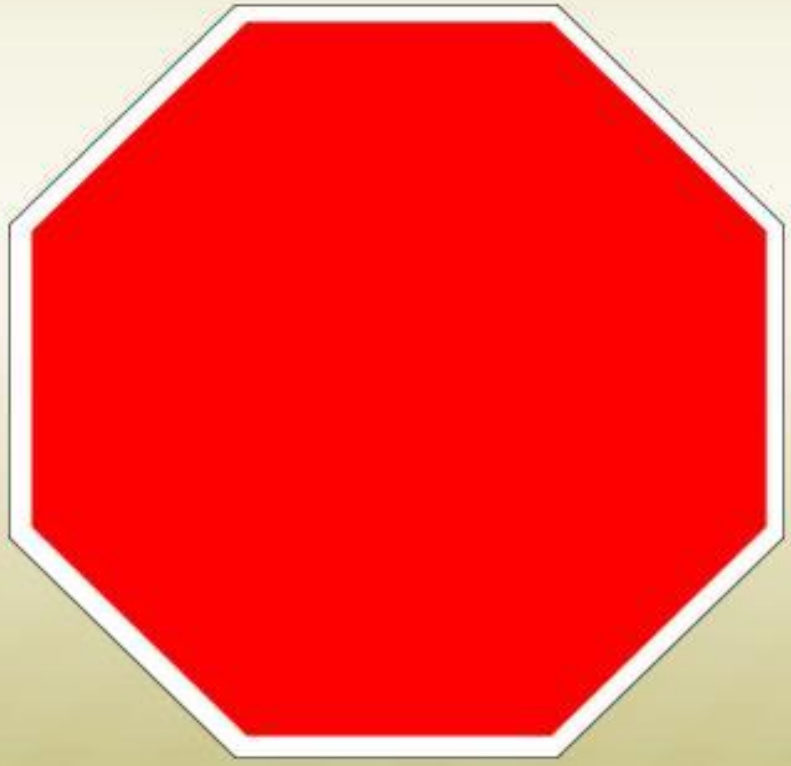




Octagon

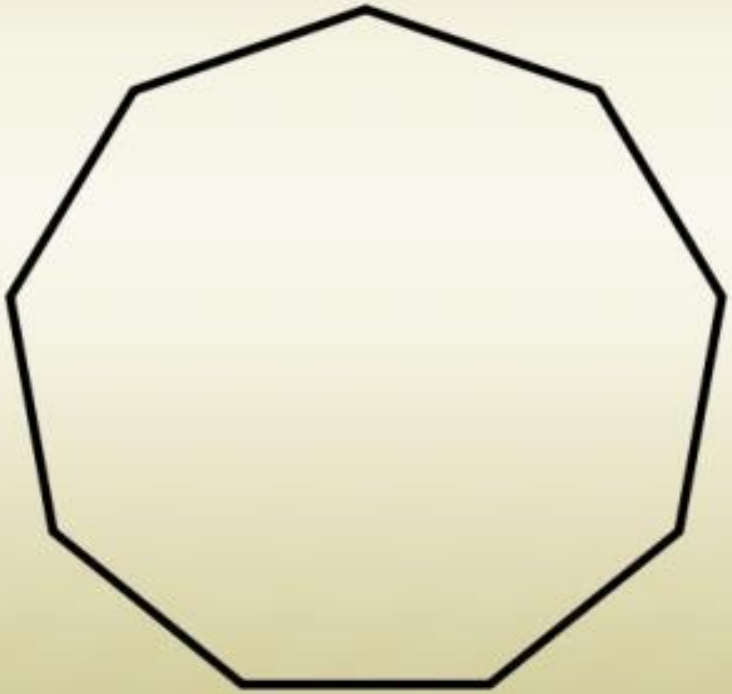
- Octagons are 8 sided shapes





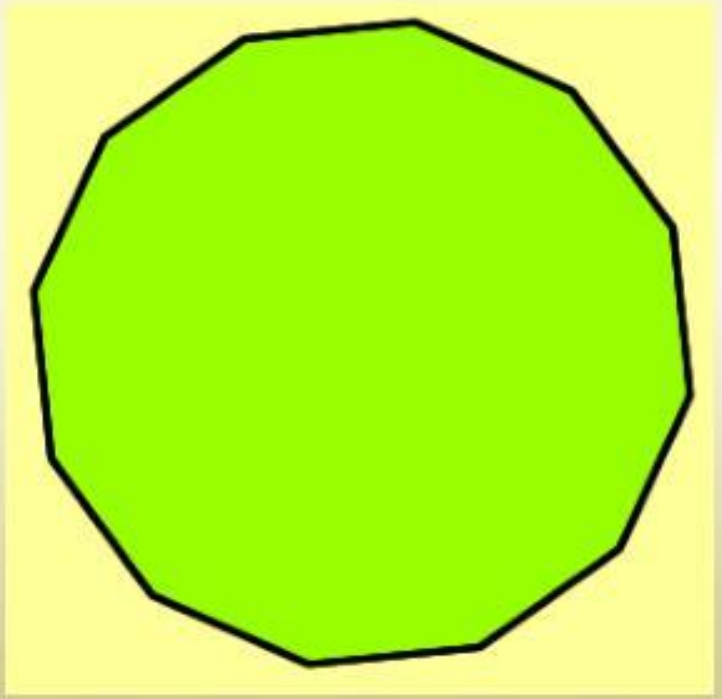
Nonagon

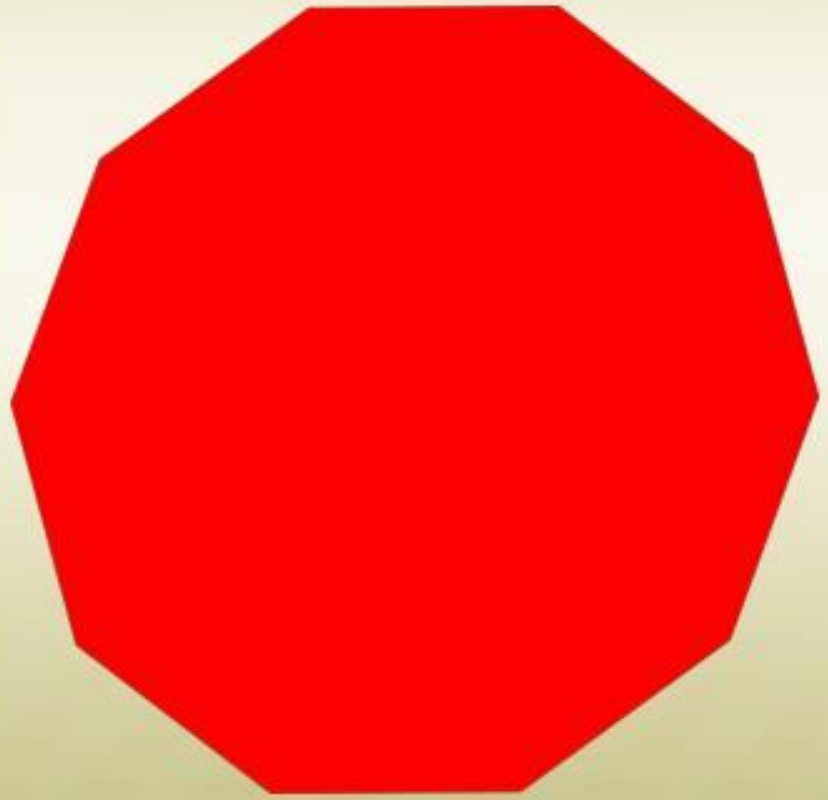
- Nonagon are 9 sided shapes



Decagon

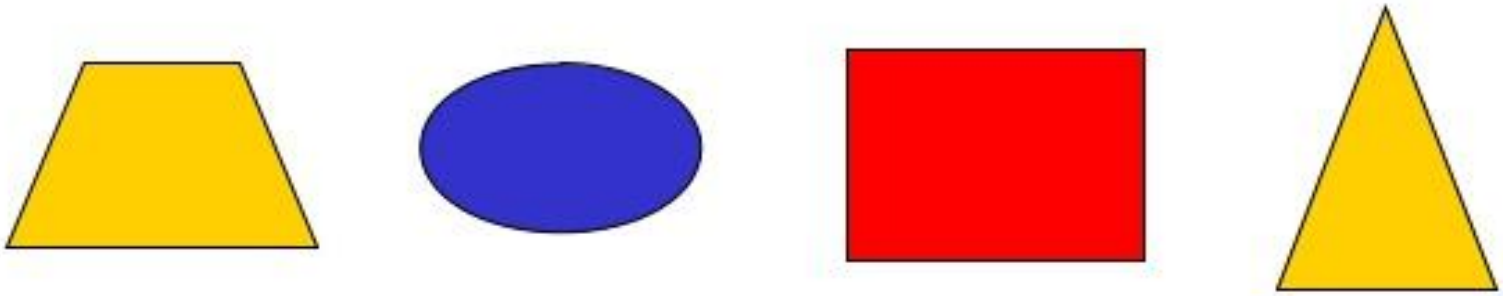
- 10 sided shape is a Decagon





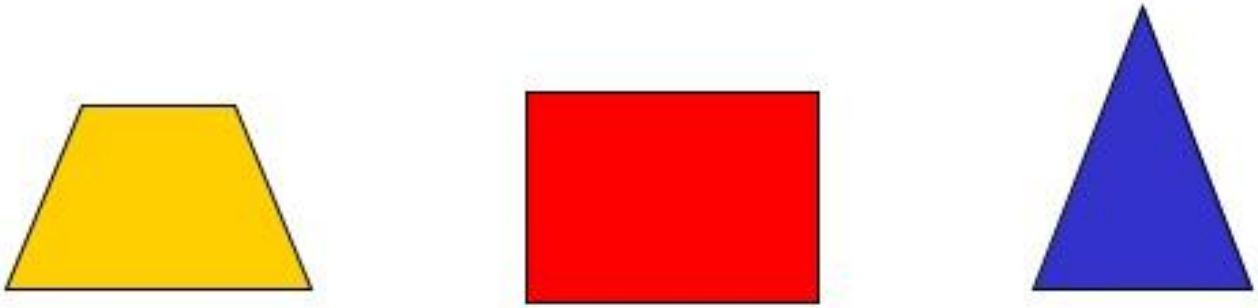
Plane Figures…

- are flat shapes
- have two **dimensions**: **length** and **width**
- may be **polygons** or other flat shapes



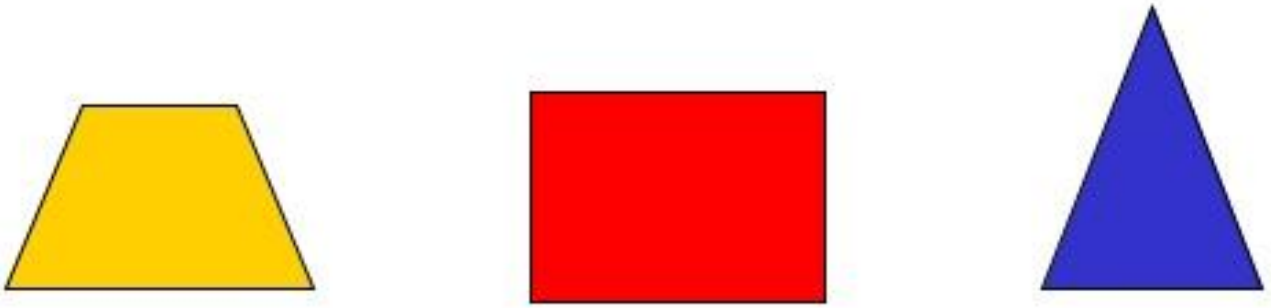
Polygons

- "poly-" means "many"
- "-gon" or "-agon" means "corners"

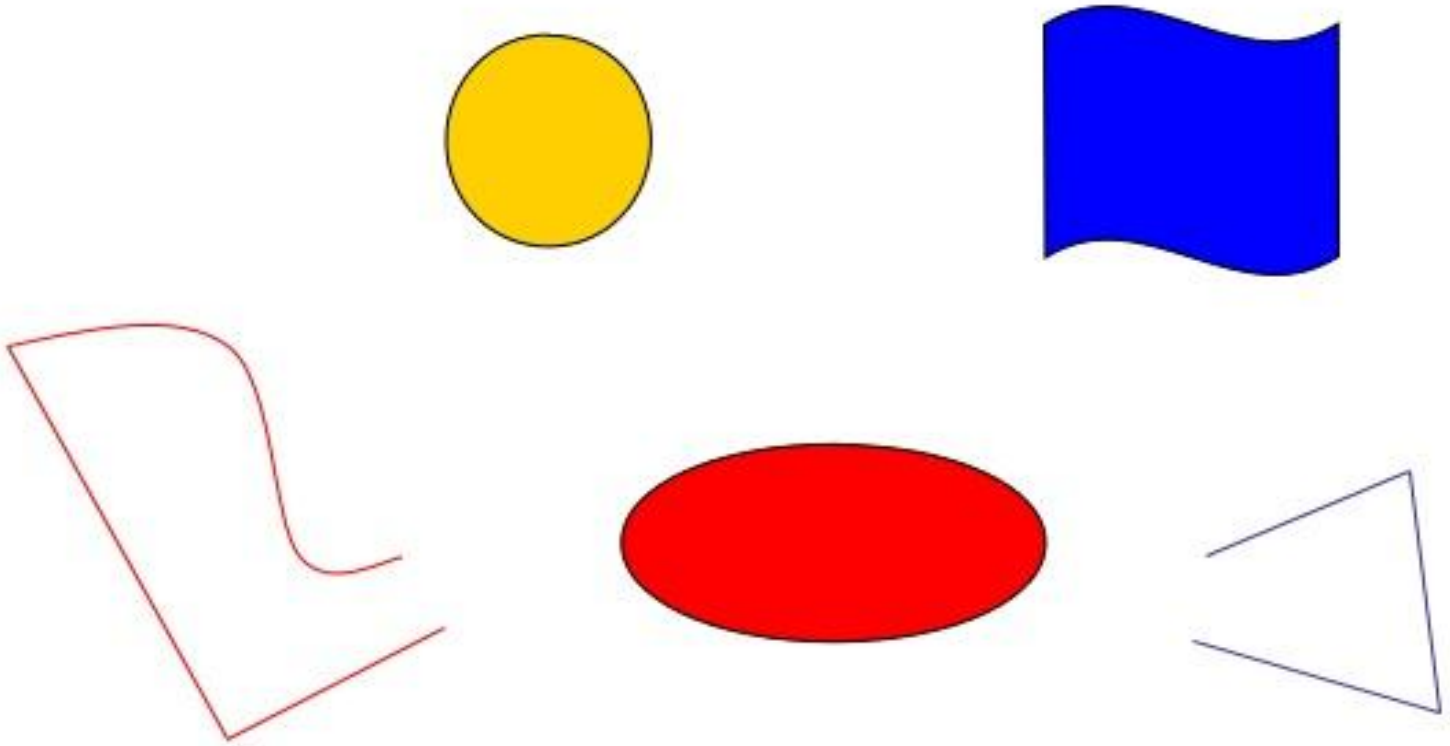


Polygons…

- are plane figures
- have three or more straight sides
- are closed figures

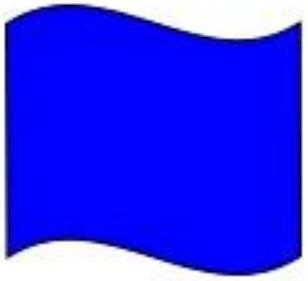


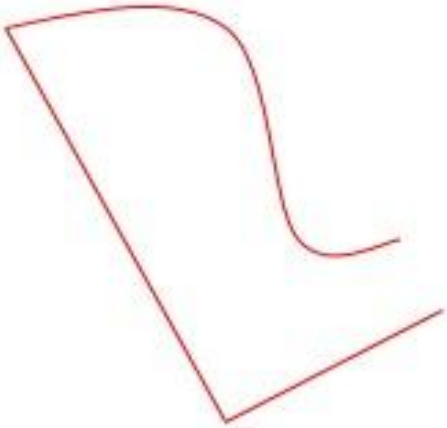
Are these polygons?

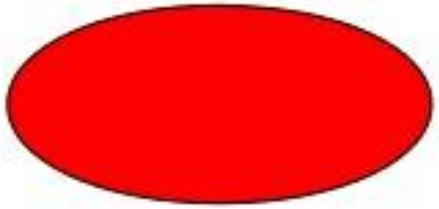


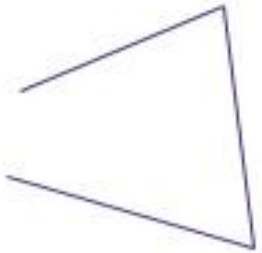
Are these polygons?

No. They have curved sides or are **not** closed figures.

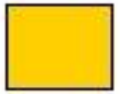








Regular Polygons…

- have sides that are all the same length
- have angles that are all the same size
- An example of a **regular polygon** is a square: 
- This is **not** an example of a regular polygon: 

Polygons…are named and classified by their *attributes*:

- their number of sides
- how their sides relate to each other

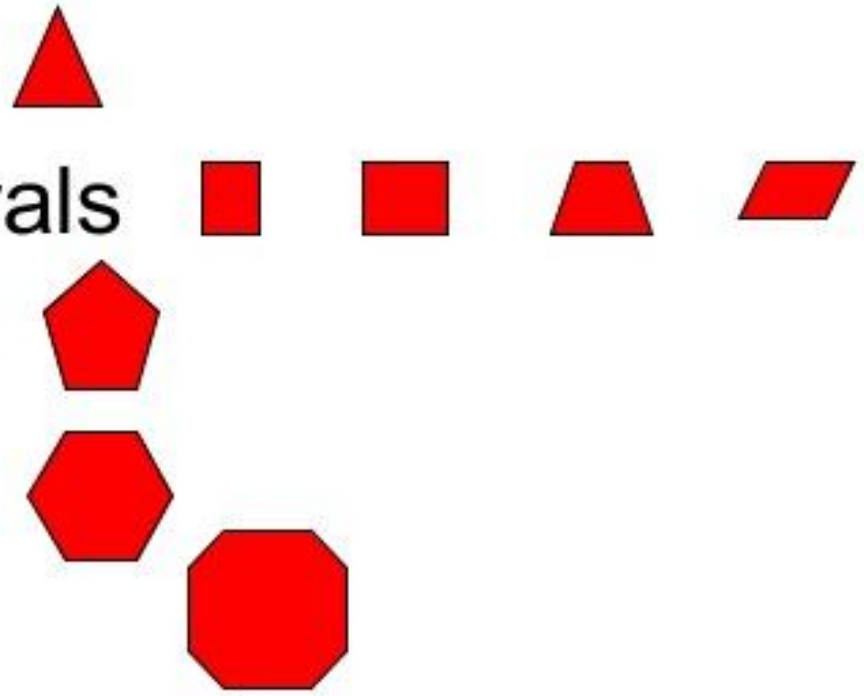
  Parallel lines never touch: 

  (remember the ll s)
- the number and type of angles they contain

  Right angles make square corners: 

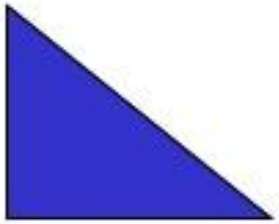
The most common Polygons:

- Triangles
- Quadrilaterals
- Pentagons
- Hexagons
- Octagons

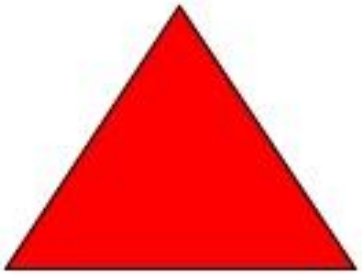


Triangles…

- Have three sides
- Have three angles
- *"tri-"* means *"three"* as in *"tricycle"*
- There are several kinds of triangles.
- Triangles may be classified by sides and by angles.

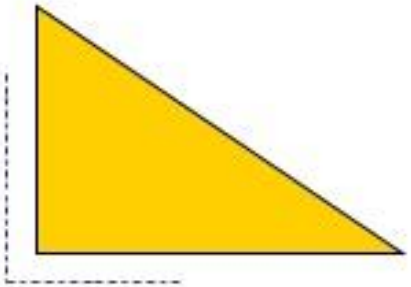


Some types of triangles:



Equilateral Triangle

("equal" "line") all sides are the same length



Right Triangle

Has one "right" angle

(a "right angle" is a "square corner," which measures 90°)

Look for an "L" shape.

Isosceles Triangle

("I-sauce-sell-leez")

Two sides are the same length

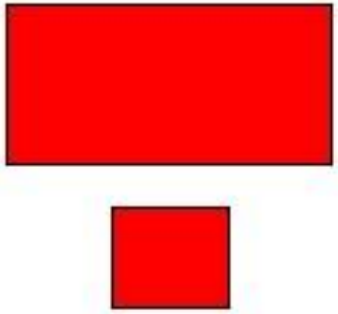
Quadrilaterals…

- have four sides
- have four angles
- may be classified by their properties: number of equal sides, number of equal angles, number of parallel pairs of sides

Common Quadrilaterals

Rectangle

- Two pairs of parallel sides
- Four square corners
- Opposite sides are the same length



Square

- Two pairs of parallel sides
- Four square corners
- All sides are the same length
- A square is also a rectangle, but all rectangles are NOT squares!

Common Quadrilaterals

Parallelogram

- Two pairs of parallel sides
- Angles are *not necessarily* the same
- Opposite sides are the same length
- Rectangles are also parallelo

Rhombus

- Two pairs of parallel sides
- Angles are *not necessarily* the same
- All sides are the same length
- A rhombus is a parallelogram
- A square is also a

Common Quadrilaterals

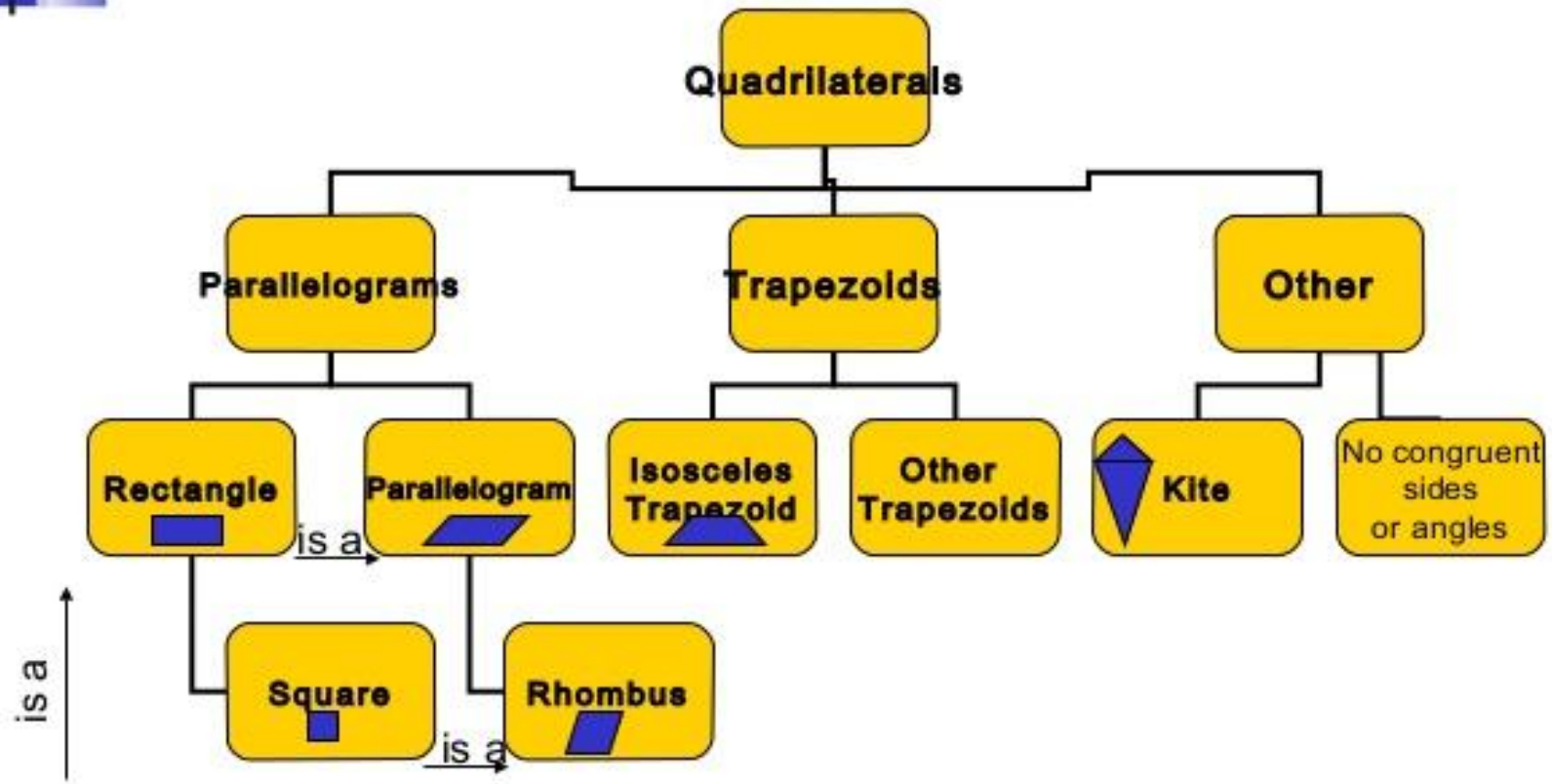
Trapezoid

- One pair of parallel sides

Kite

- Two pairs of adjacent (touching) sides which are the same length

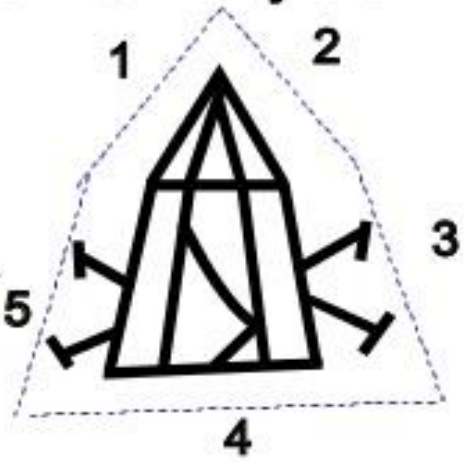
Quadrilaterals



Pentagons…

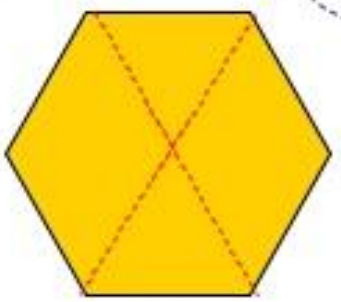
- have 5 sides
- have 5 angles

- *"pent-"* or *"penta-"* means *"five"*
- look like the front face of a "tent" you might take camping



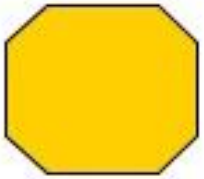
Hexagons

- have six sides
- have six angles
- *"hex-"* or *"hexa-"* means *"six"*
- Remember that "he**x**" and "si**x**" both contain "**x**".
- The cells of a honeycomb are *hexagonal.*



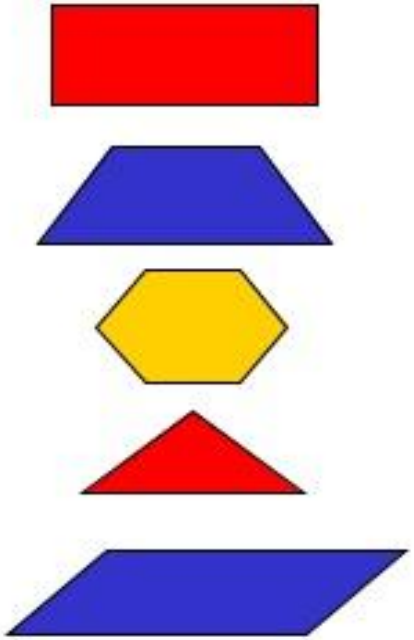
Octagons…

- Have eight sides
- Have eight angles
- “Octa-” or “octo-” means “eight”
- Remember that a stop sign is an octagon
- Remember than an octopus has eight arms



Name that Polygon!

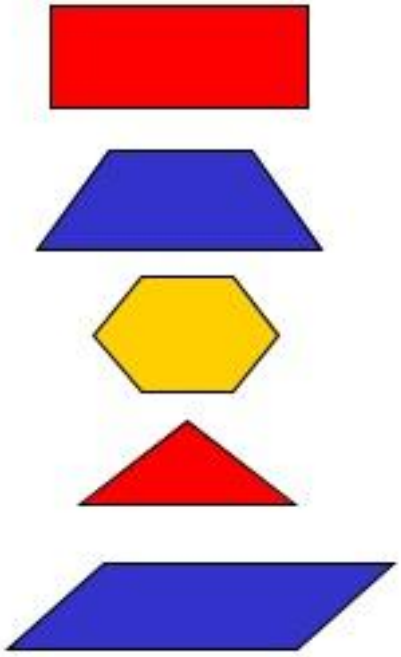
(by its most specific name)



Name that Polygon!

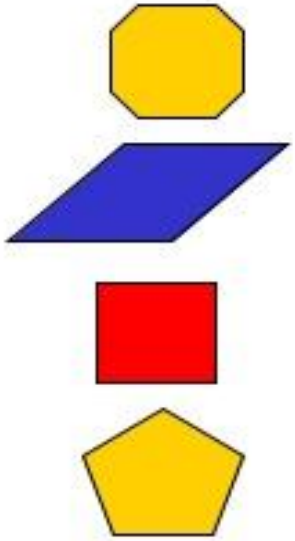
(by its most specific name)

- Rectangle
- Trapezoid
- Hexagon
- Triangle
- Parallelogram



Name that Polygon!

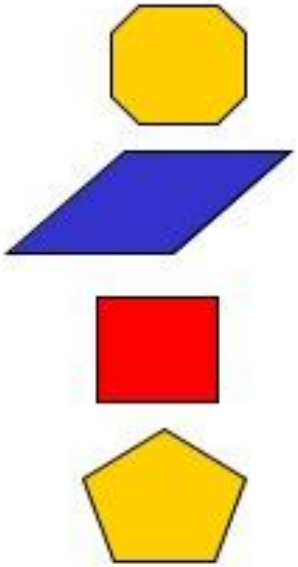
(by its most specific name)



Name that Polygon!

(by its most specific name)

- Octagon
- Rhombus
- Square
- Pentagon




THANK YOU