Geometry

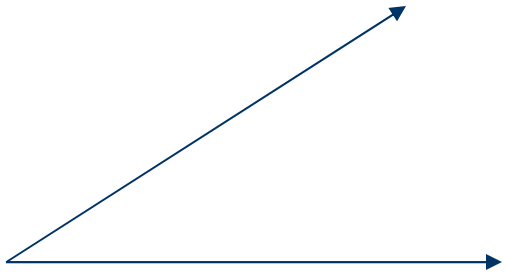
As used in

the Construction Industry.

Geometric Lines & Angles

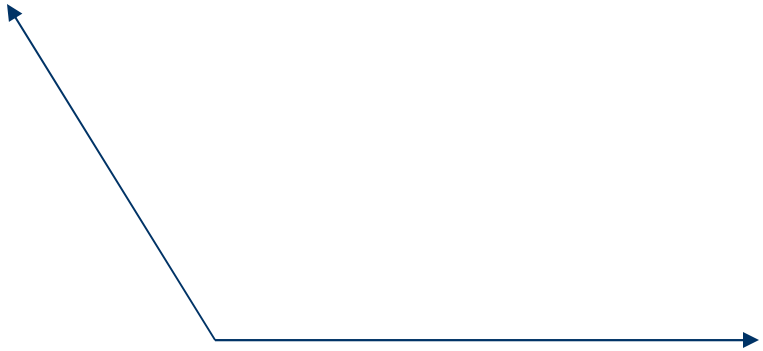
Acute Angle

- An acute angle is a positive angle whose measure is less than 90^{o}.



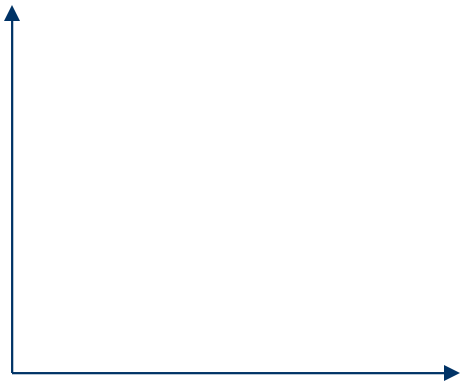
Obtuse Angle

- An obtuse angle is any angle whose measure is greater than 90^{o} and less than 180^{o}.



Right Angle

- A right angle is a 90^{o} angle.

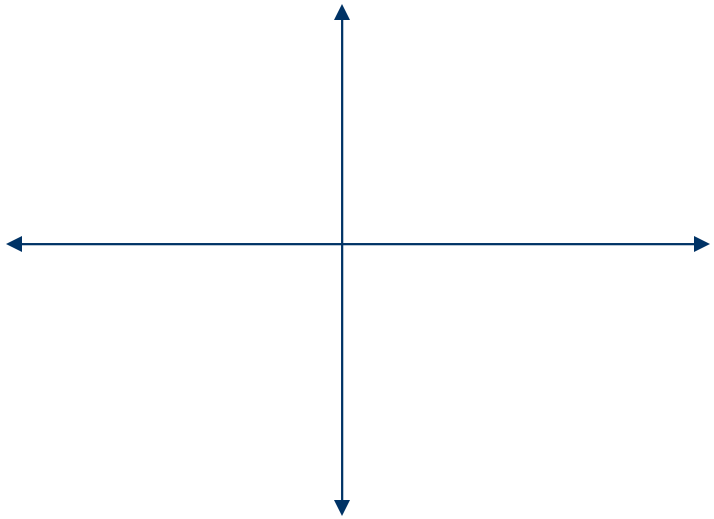


Straight Angle

- A straight angle is a 180^{o} angle.

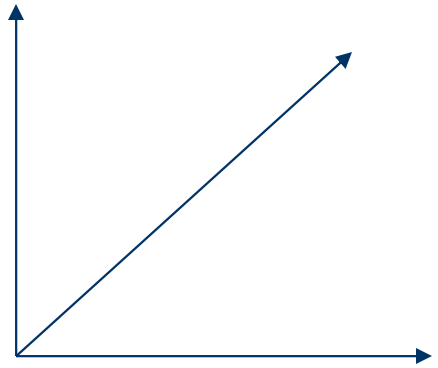
Perpendicular Lines

- Perpendicular lines are two lines that intersect to form right angles (90^{o}).



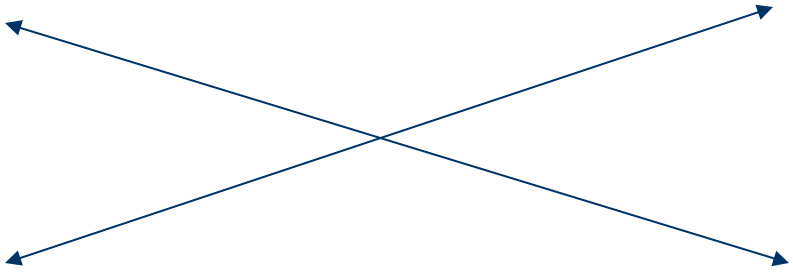
Adjacent Angles

- Adjacent angles are any two angles that share a common vertex and a common side that separates them.



Opposite Angles

- Opposite angles are two angles that share a common vertex, do not have a common side, and which are formed by intersecting lines.



Plane Geometry

Plane Geometry

- A **plane** is a flat surface. It has only two dimensions: length and width (or depth)

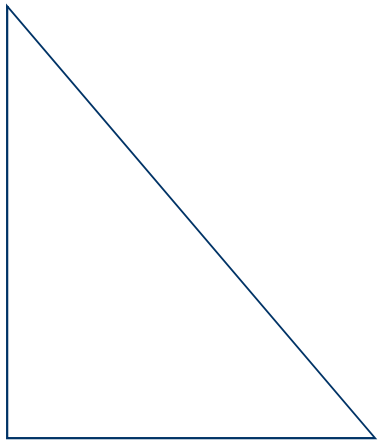
- Therefore, **Plane Geometry** is the study of plane figures, including **polygons**.

Types of Polygons

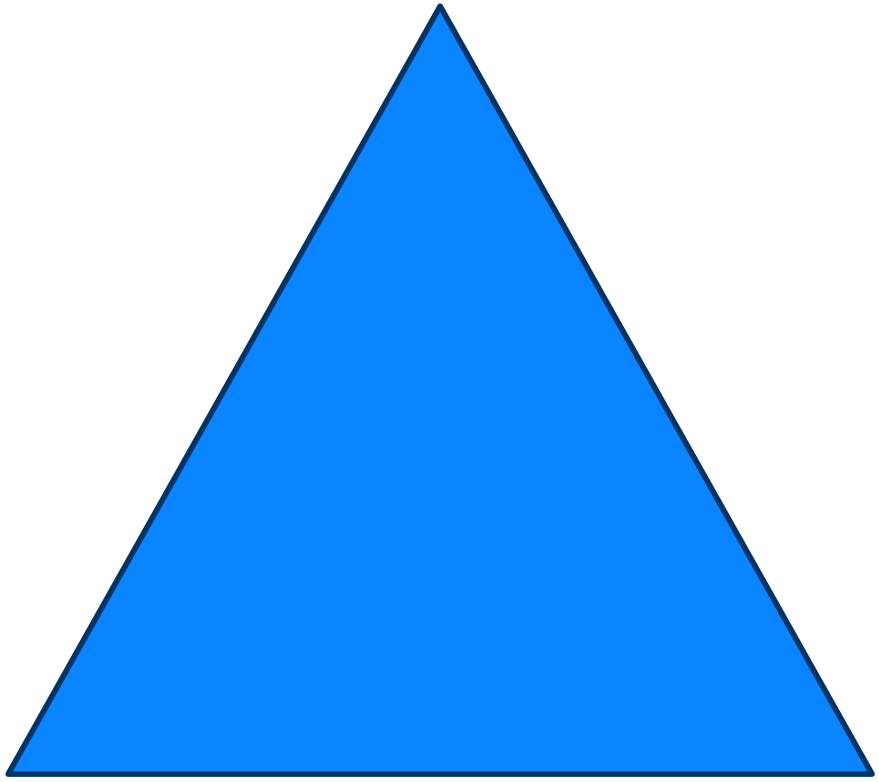
Used in the
Construction Industry

Triangle – 3 Sides

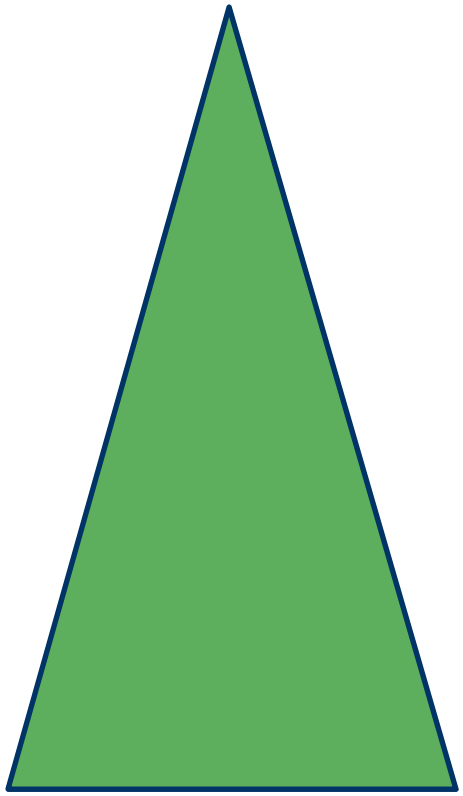
- A triangle might be in the form of a roof or stairs.
- Remember that a “tricycle” has three wheels.



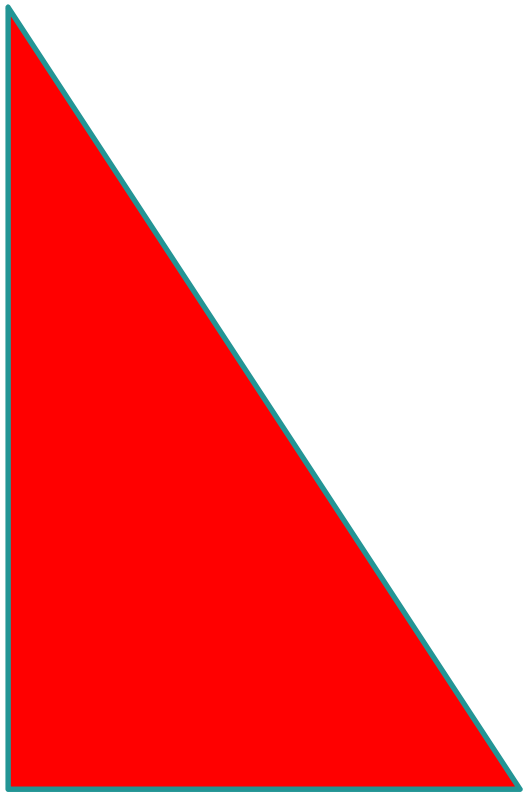
Equilateral



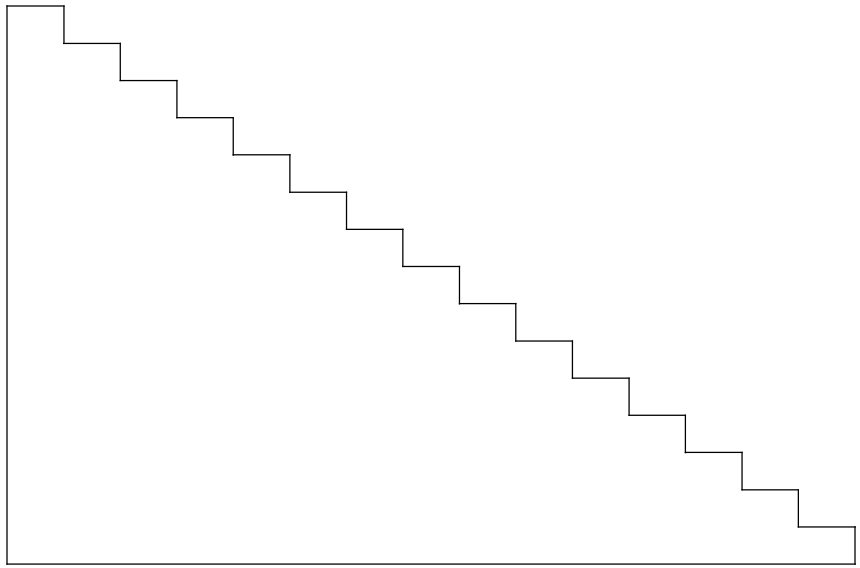
Isosceles



Scalene

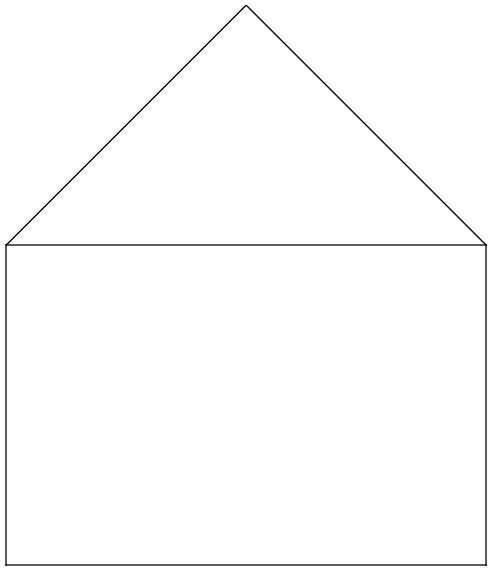


Stairs



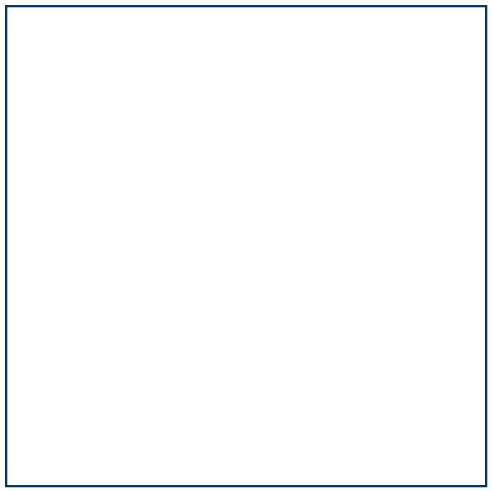
AHHH

Roofs



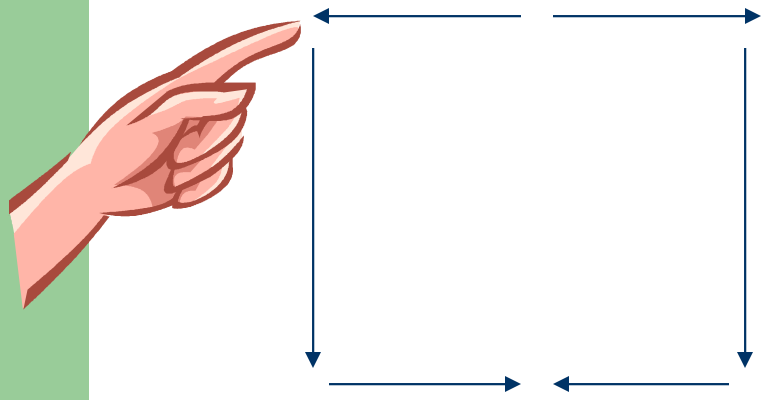
Square – 4 Equal Sides

- Squares are found in every aspect of construction, including square rooms, square windows, etc.

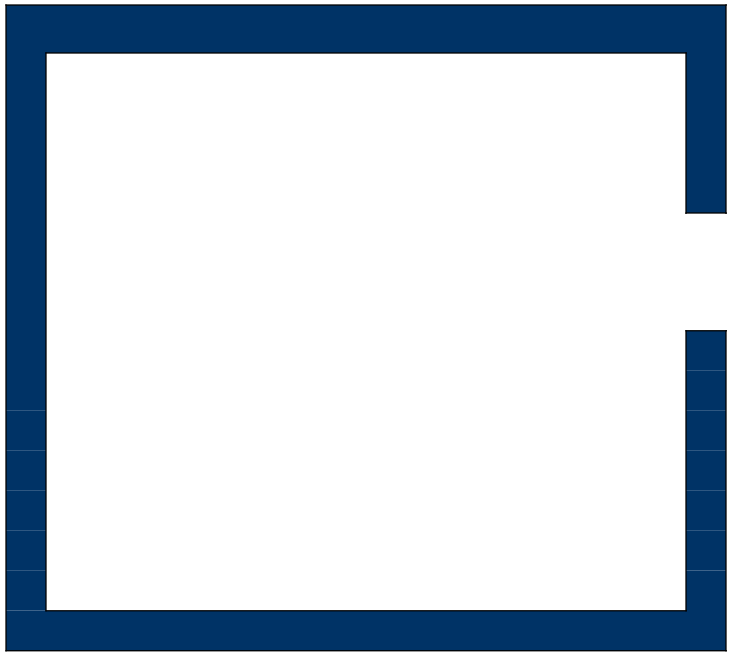


Square – 4 Equal Sides

- To remember that a square has four equal sides, think of dice, or the gesture that people make to suggest that someone is “square.”



Square Room

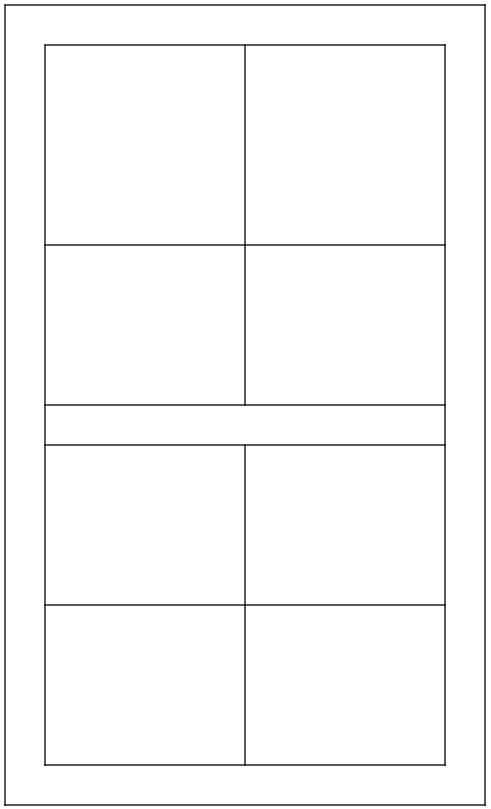


Square Window

Rectangle – 4 Sides

- Like squares, rectangles are found in every aspect of construction, including rectangular rooms, rectangular windows, etc.

Rectangular Window



Rectangular Window

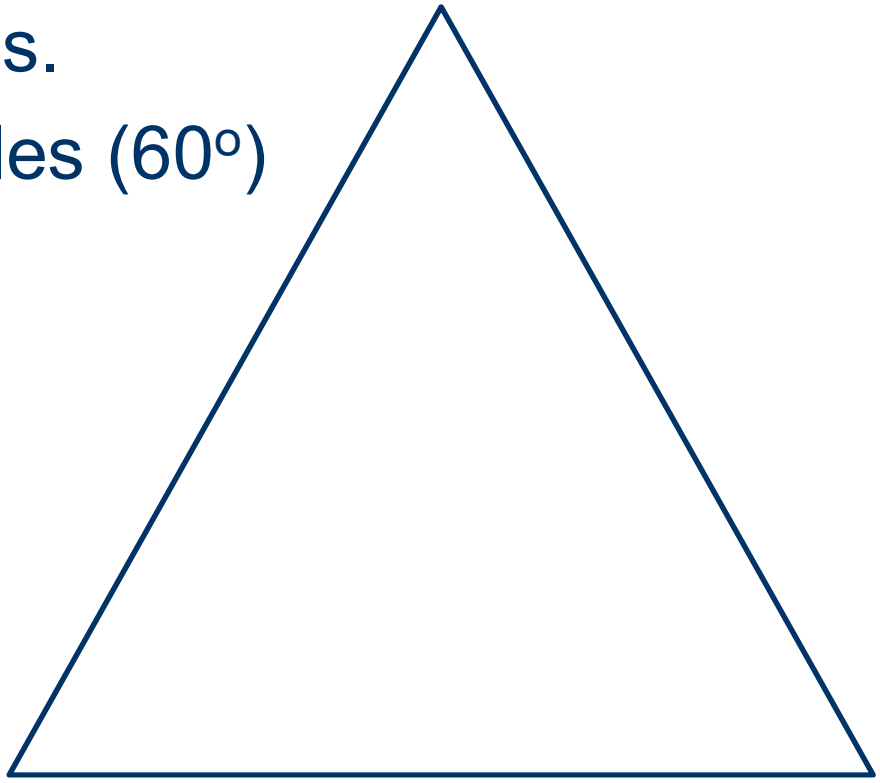
REGULAR POLYGONS

Regular Polygons

- Regular Polygons are those that have equal angles and equal sides.

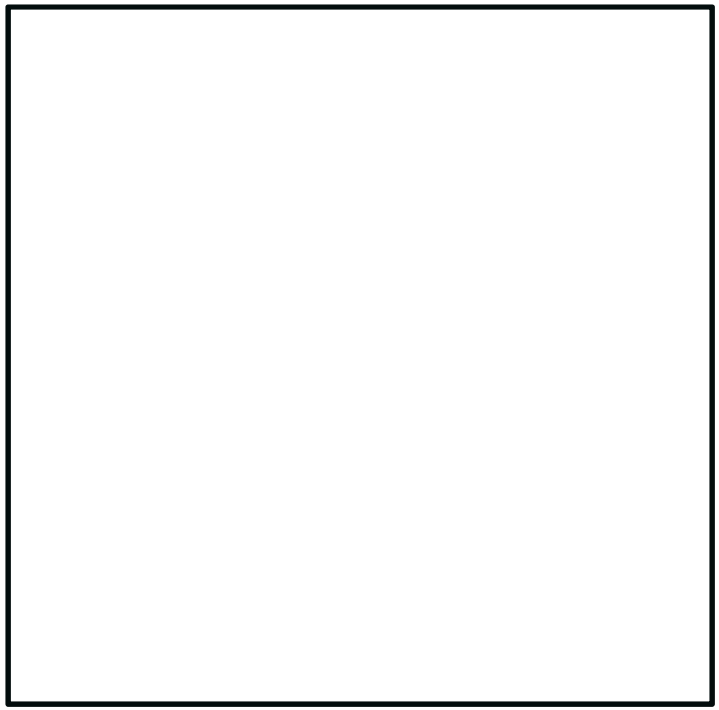
Equilateral Triangle

- Three equal sides.
- Three equal angles (60^o)



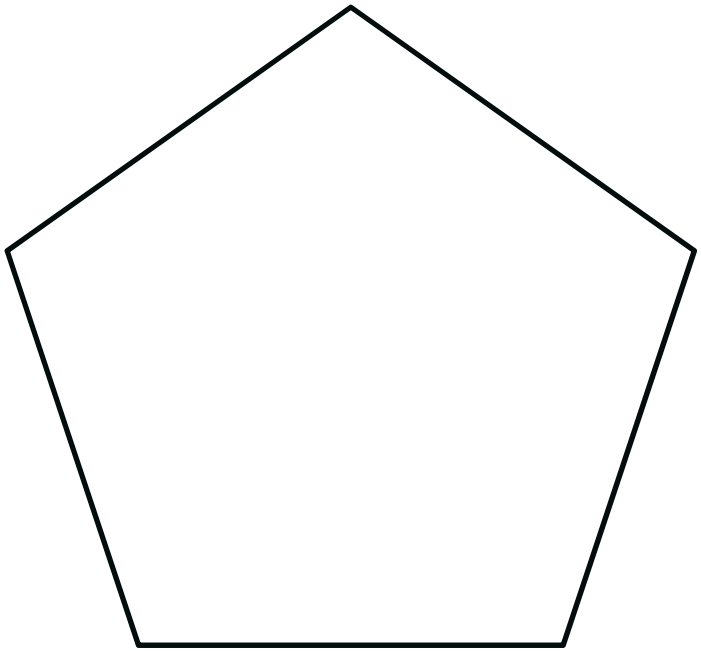
Square

- Four Equal sides.
- Four Equal angles (90^o).



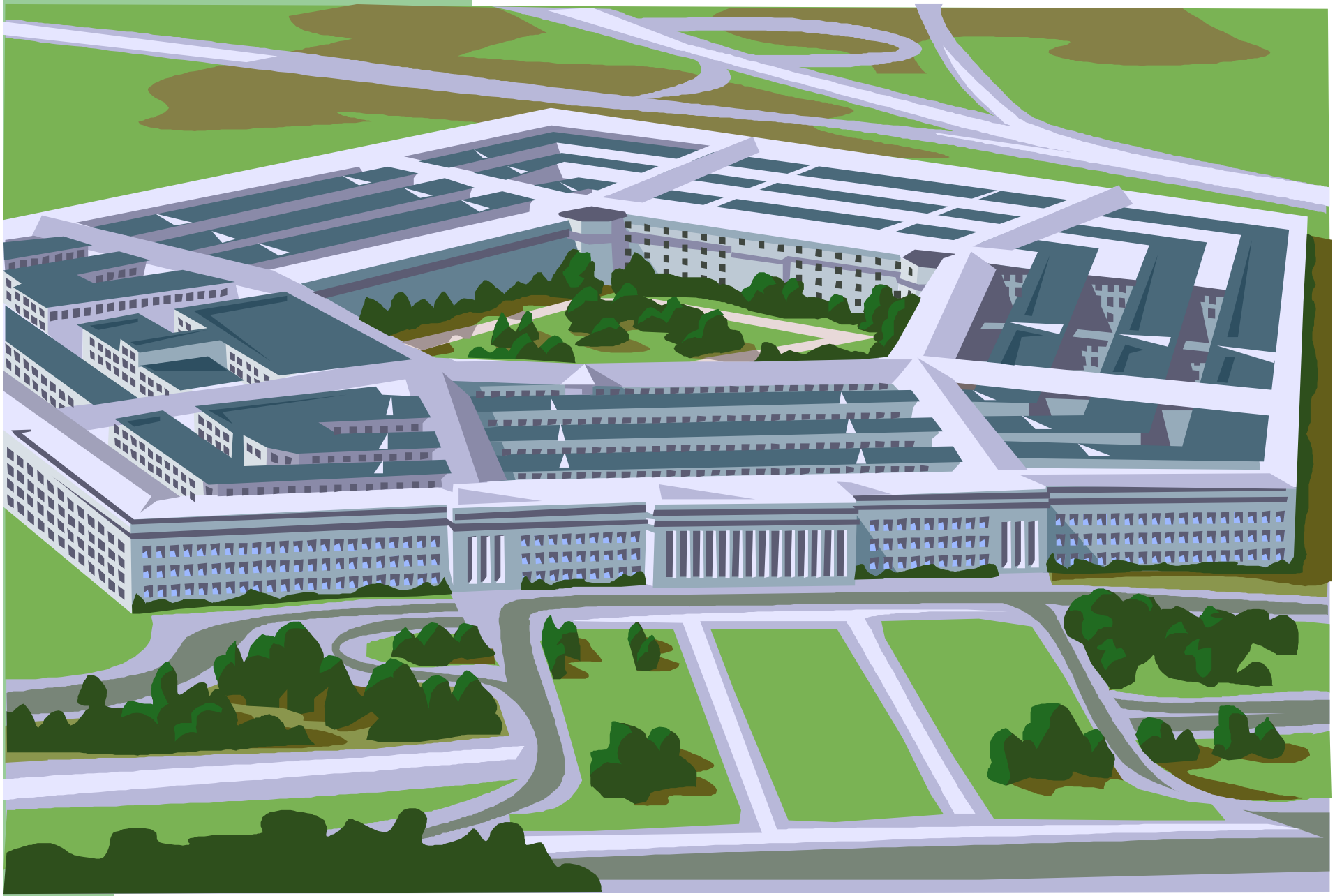
Pentagon

- 5 Equal Sides
- 5 Equal Angles (72^{o})



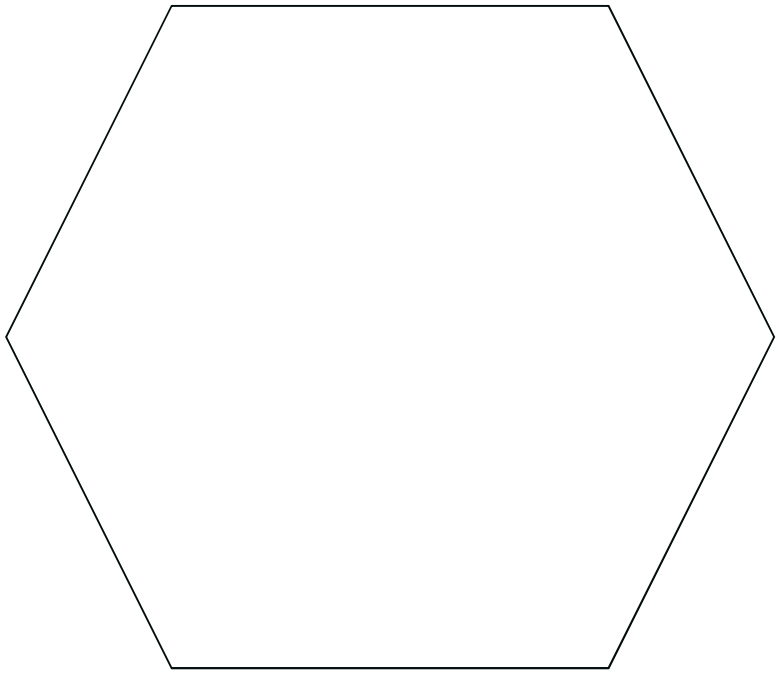
Pentagon

- Shakespeare wrote in iambic pentameter (five groups of two syllables).
- The Department of Defense is housed in a building in Washington, DC that is the shape of a pentagon.



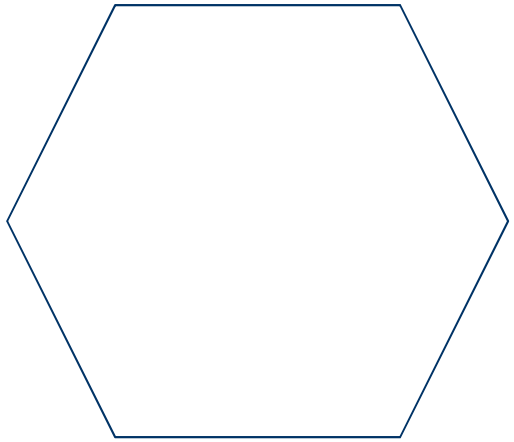
Hexagon

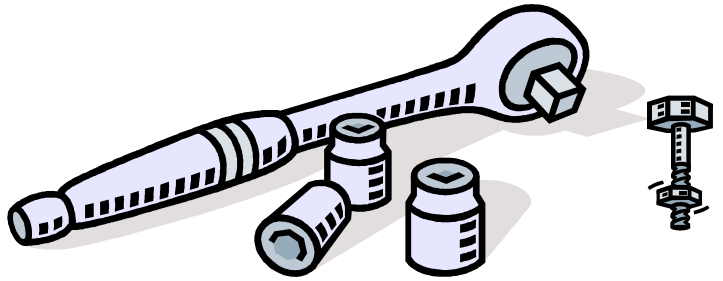
- 6 Equal Sides
- 6 Equal Angles (60^{o})



Hexagon
Six Equal Angles and Sides

- Often, gazebos and some towers are built in the shape of a hexagon.
- Nuts and bolts have hexagonal heads; most wrenches are made to accommodate this.
- “Hex” and “six” both end in “X”.





Hexagonal Gazebo

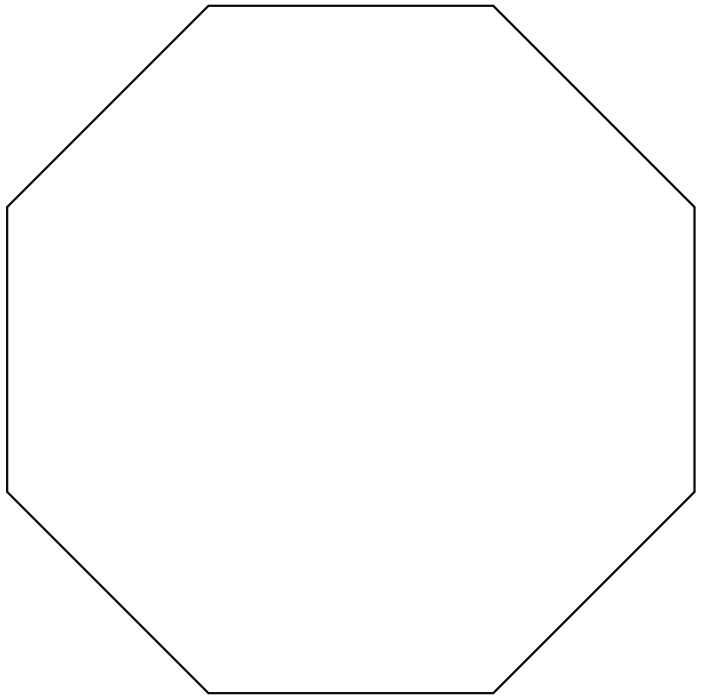
Septagon (also “Heptagon”)

- 7 Equal Sides
- 7 Equal Angles (51.429^{o})

- This is rarely used in construction.

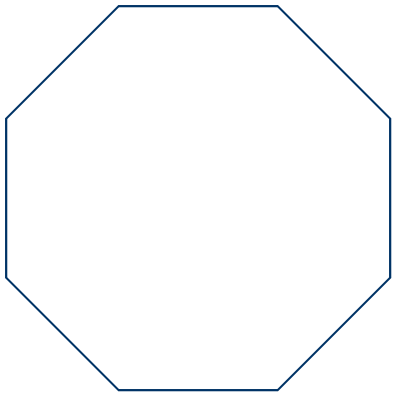
Octagon

- 8 Equal Sides
- 8 Equal Angles (45°)



Octagon

- Again, gazebos and some towers are built in the shape of an octagon.
- Remember that an octopus has eight tentacles.
- A stop sign has eight sides.

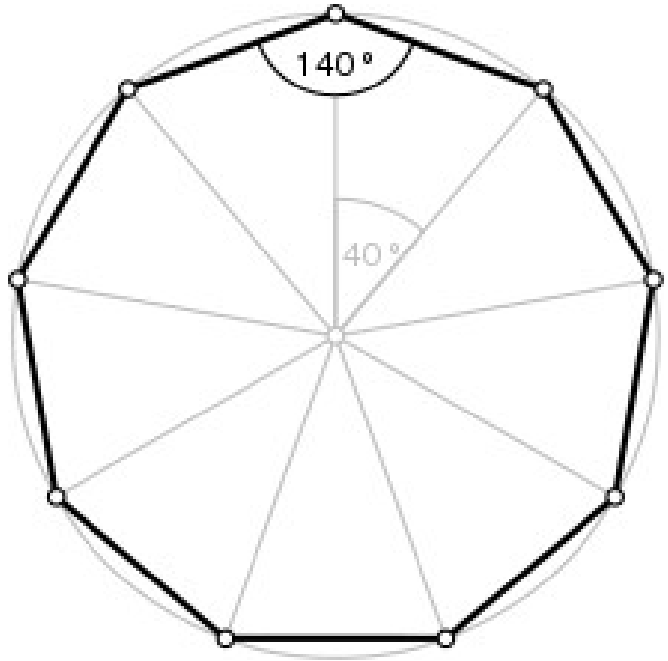


Octagonal Gazebo

Octagonal Sign

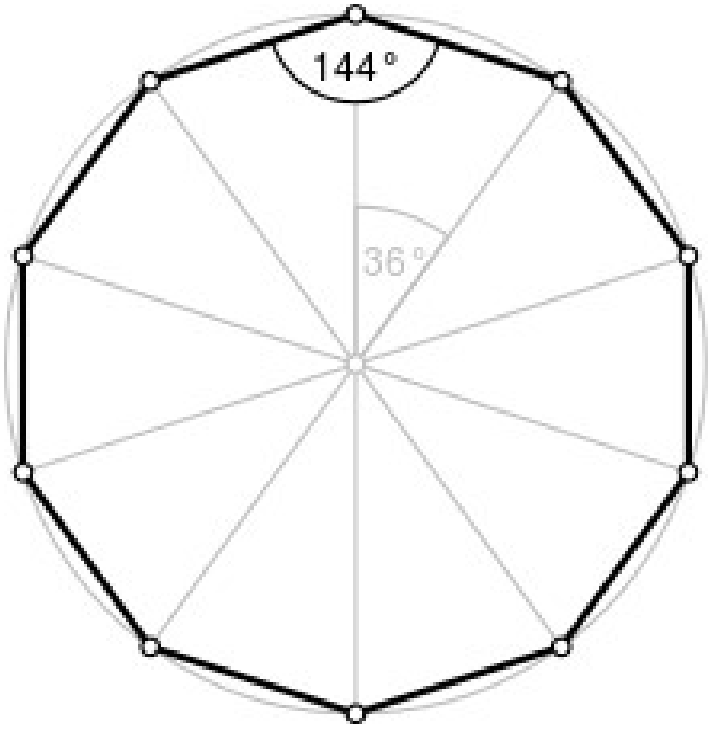
Nonagon

- 9 Equal Sides
- 9 Equal Angles (40º)



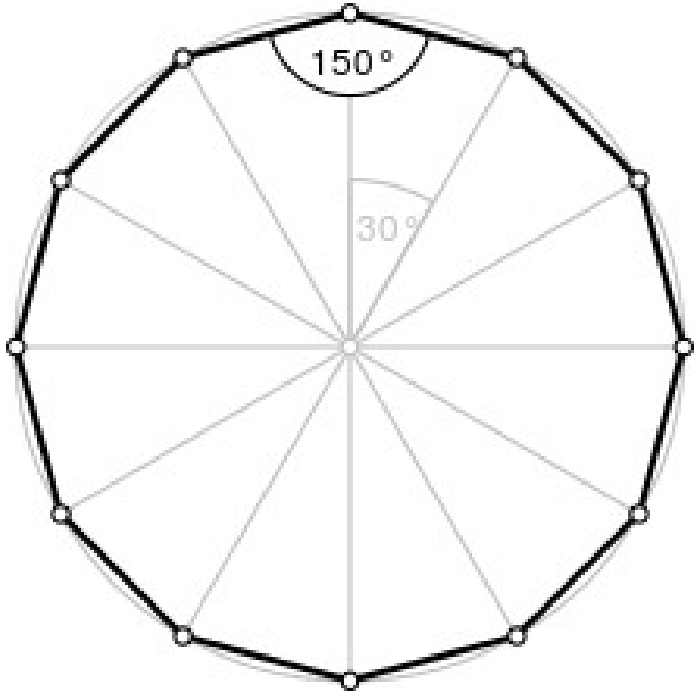
Decagon

- 10 Equal Sides
- 10 Equal Angles (36º)



Dodecagon

- 12 Equal Sides
- 12 Equal Angles (30º)



n-gon

- An *n*-gon is any other regular polygon other than those listed above.
- Examples:
  - 11-gon
  - 13-gon
  - 14-gon, etc.