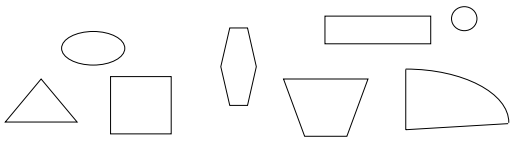
Geometry Concepts

Figures that lie in a plane are called **plane figures**.

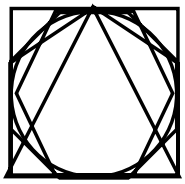


These are all **plane figures**.

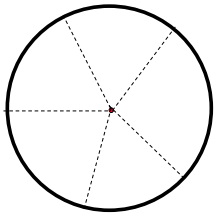
A **polygon** is a plane closed figure determined by **three or more** line segments

Polygon	No. of Sides	Drawing
Triangle	3	
Quadrilateral	4	
Pentagon	5	
Hexagon	6	
Heptagon	7	
Octagon	8	
Nonagon	9	
Decagon	10	

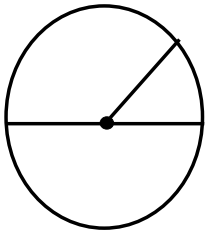
What happens as the number of sides of a polygon increases?



As the number of sides increases, the plane figure becomes more circular.

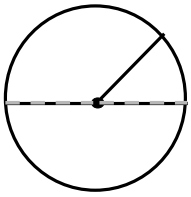


A **circle** is defined as a set of points in a plane equidistant from a given point called the center.



A **diameter** is a line segment connecting any two points of the circle passing through the center of the circle.

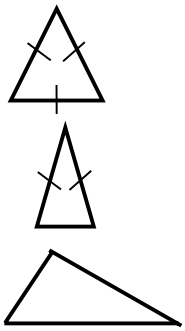
A **radius** is a line segment connecting the center of the circle with any point on the circle.



A diameter is equal to two radii.

d = 2r

Triangle Classification by **Sides**:

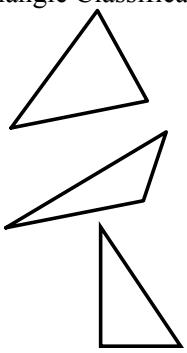


Equilateral

Isosceles

Scalene

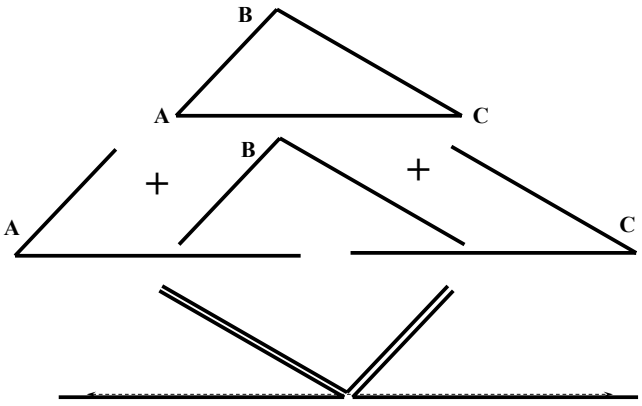
Triangle Classification by **Angles**:



Acute

Obtuse

Right



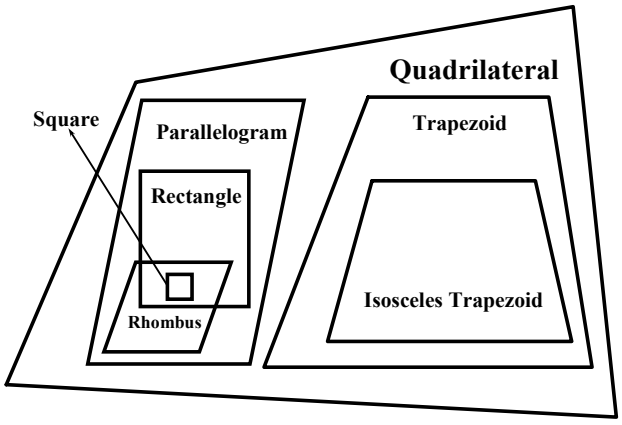
The sum of the measures of the interior angles of a triangle is **180 degrees**.

If the two nonparallel sides of a trapezoid are equal in length, it is called an **isosceles trapezoid.**

If all the angles of a parallelogram measure 90, it is called a **rectangle**.

If all the sides of a parallelogram are the same length, it is called a **rhombus**.

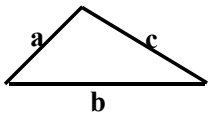
If all the sides of a parallelogram are the same length and the angles measure 90, it is called a **square**.

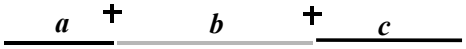


Two measures of plane figures are important to mathematicians:

a. the distance around a plane figure called the **perimeter** or **circumference** and
b. the number of square units in the interior of a plane figure called the **area**.

Perimeter

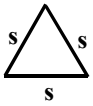


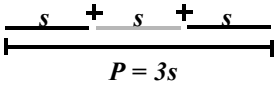


$P = a + b + c$

The **perimeter** of every polygon may be found by adding all the sides.

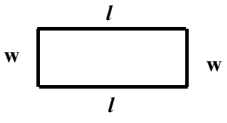
Equilateral Triangle Shortcut

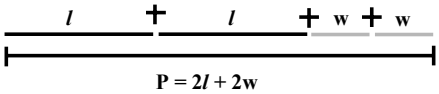




$P = 3s$

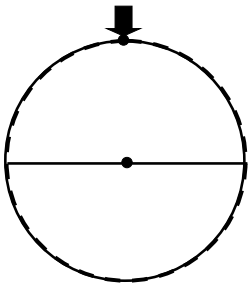
Rectangle Shortcut

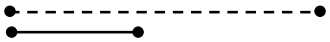




$P = 2l + 2w$

The **circumference** is the distance around a circle.





Circumference ÷ Diameter always results in the same ratio. This number is named "**pi**" (π) and is approximately ($\approx$) equal to $\frac{22}{7}$ or **3.14**.

$$\frac{\text{Circumference}\,(C)}{\text{Diameter}\,(d)} = \text{Pi}\,(\pi)$$

or

$$C = \pi d$$

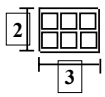
Since $d = 2r$,

$$C = \pi(2r) \text{ or } C = 2\pi r$$

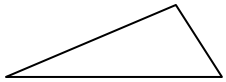
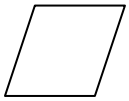
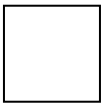
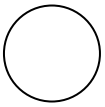
Area

Area is measured in square units. A square unit is a square one unit on each side. □

For example, start with a rectangle with length (*l*) 3 units and width (w) 2 units.



A = 6 units²
A = 3 · 2 units²
A = *l* · w

Plane Figure	Drawing	Perimeter/ Circumference	Area
Triangle		$P = a + b + c$	$A = \frac{1}{2}bh$
Parallelogram		$P = a + b + c + d$	$A = bh$
Rectangle		$P = 2l + 2w$	$A = lw$
Rhombus		$P = 4s$	$A = bh$
Square		$P = 4s$	$A = s^2$
Trapezoid		$P = a + b + c + d$	$A = \frac{1}{2}h(b_1 + b_2)$
Circle		$C = \pi d$ or $2\pi r$	$A = \pi r^2$

Introduction to Geometry Notes

Basic Concepts:

	Description	Drawing
1.		
2.		
3.		

Parts of Lines:

	Description	Drawing
1.		
2.		

Definition of an Angle: _____

Types of Angles:

	Description	Drawing
1.		
2.		
3.		
4.		

Pairs of Angles:

	Description	Drawing
1.		
2.		
3.		

Lines in a Plane:

	Description	Drawing
1.		
2.		
3.		

When two lines intersect, pairs of _____ angles are formed.

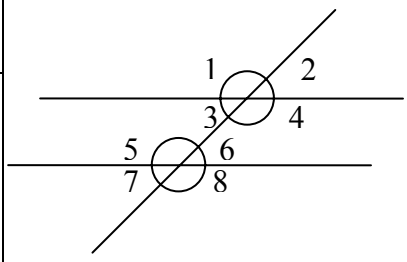
Types of Intersecting Lines in a Plane:

	Description	Drawing
1.		
2.		

Vertical angles have the _____ measure.

If two parallel lines are cut by a third line (called the _____), various pairs of angles are formed.

Angles formed by Parallel Lines cut by a Transversal:

	Description	Drawing
1.		
2.		
3.		

Polygons

Polygon	Number of Sides	Drawing
Triangle		
Quadrilateral		
Pentagon		
Hexagon		
Heptagon		
Octagon		
Nonagon		
Decagon		

Geometry Definitions and Facts

A _____ is defined as a set of points in a plane equidistant from a given point called the center.

A _____ is a line segment connecting any two points of the circle passing through the center of the circle.

A _____ is a line segment connecting the center of the circle with any point on the circle.

A _____ is equal to two radii ($d =$).

Classification of Triangles by Sides	

Classification of Triangles by Angles	

The sum of the measures of the interior angles of a triangle is _____ degrees.

If the two nonparallel sides of a trapezoid are equal in length, it is called an

_____.

If all the angles of a parallelogram measure 90°, it is called a

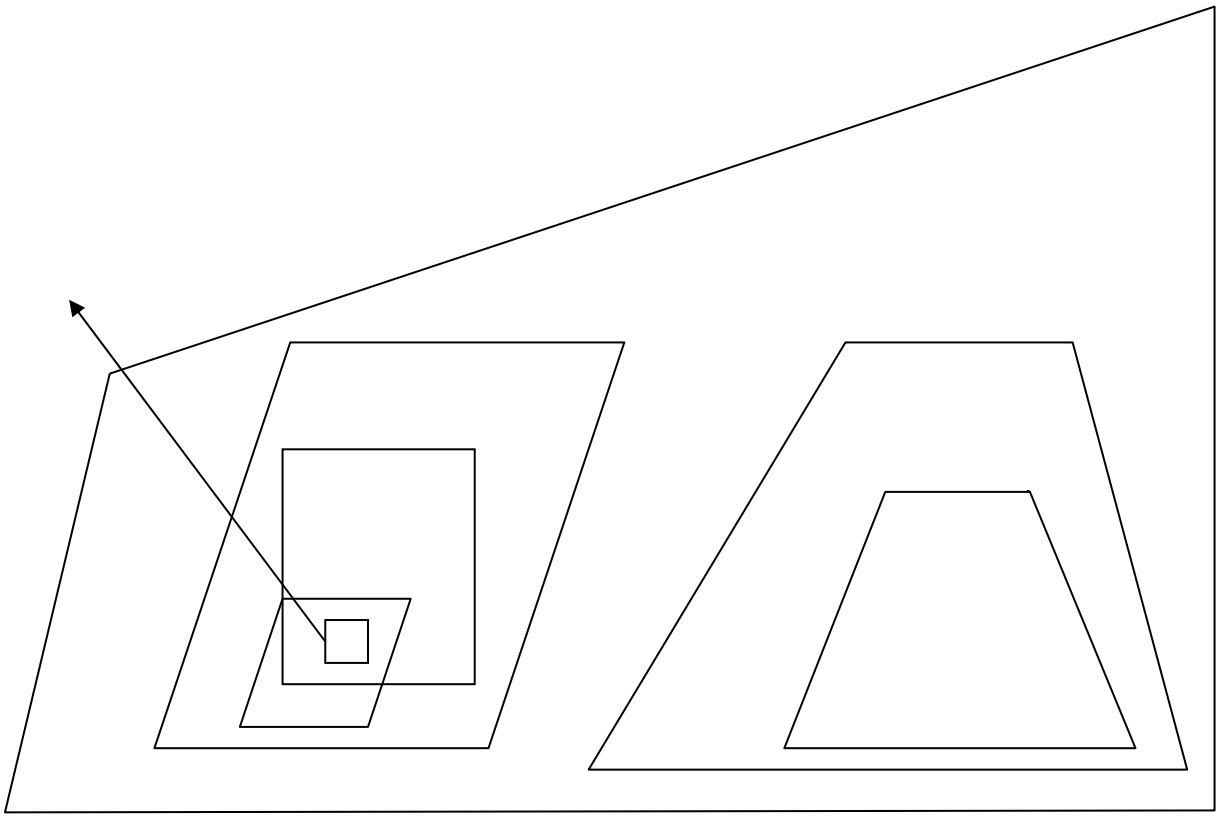
_____.

If all the sides of a parallelogram are the same length, it is called a

_____.

If the sides of a parallelogram are the same length *and* the angles measure 90°, it is called a

_____.



Plane Figures

The distance around a plane figure is called the _____ or

_____.

The number of square units in the interior of a plane figure is called the _____.

Plane Figure	Drawing	Perimeter or Circumference	Area
Triangle			
Parallelogram			
Rectangle			
Rhombus			
Square			
Trapezoid			
Circle			

Solid Figures

The number of cubic units in the interior of a solid figure is called the _____.

Solid Figure	Drawing	Volume Formula
Rectangular Solid		
Cube		
Sphere		
Circular Cylinder		
Cone		
Square-Based Pyramid		