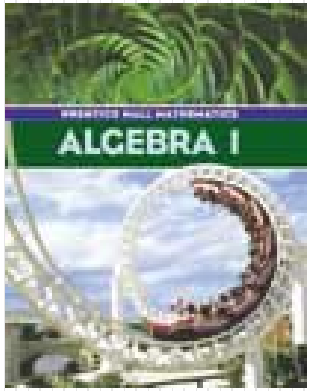
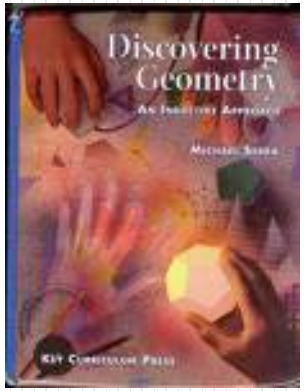
Mr. Northcutt's Math Classes
Class Presentation

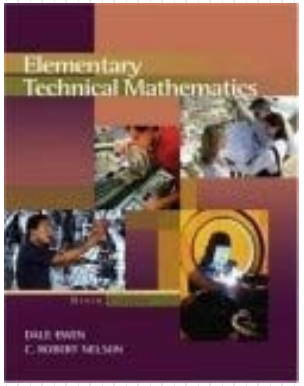
January 5, 2009 (75)



Math 1



Math 2



Applied Math

Math 1 – Daily Summary

- **Announcements**
  - **Welcome Back!**
- **Class Objectives – *What Should You Learn?***
  - Begin Chapter 9 – Polynomials
    - **Polynomial Terminology**:
      - Term, Coefficient, Degree
      - Naming by # of Terms (Monomial, Binomial, Trinomial, Polynomial)
      - Naming by Degree (Constant, Linear, Quadratic, Cubic, Nth Degree)
      - "Standard Form" of a Polynomial (Order by Degree of Terms…)
    - **Adding & Subtracting Polynomials** ("Like Terms")
- **Assignment**
  - **Section 9-1**: 2-40 EVEN, 41, 49, 50

A Quick Refresher

$(2x)^0$

$(2d)^3$

$y^2 y^3$

$\dfrac{x^4 y}{x^2 y^4}$

$(2x^2)(3x)$

$3x + 2x + x$

Polynomial Terminology

- **TERM: Single number or product of a number and one or more variables raised to a power.**
  - The terms in an ALGEBRAIC EXPRESSION are separated by plus (+) and minus (-) signs.
- **COEFFICIENT: The numerical factor of a term.**
- **DEGREE OF A TERM: The sum of the powers of the variables in a term.**

$2x^1$	$4x^1y^2$	$3x^1y^1$	6
Coefficient = 2 Degree = 1	Coefficient = 4 Degree = 3	Coefficient = 3 Degree = 2	Coefficient = 6 Degree = 0

Constant has Degree 0!

Naming Polynomials (by # of Terms)

- **Monomial:** Contains only one (1) term (product of a number and zero or more variables).
- **Binomial**: A polynomial with exactly two (2) terms.
- **Trinomial**: A polynomial with exactly three (3) terms.
- **Polynomial**: Monomial or sum/difference of unlike monomials (ALL above are also Polynomials).

$5xy^3 - 4$

binomial

$3x^2 + 2xy - 5$

trinomial

$4x$

monomial

$x^5 - 4x^3 + 3x^2 - 2x + 9$

polynomial

Degree of a Polynomial

- **Degree of Polynomial:** The degree of the highest degree monomial contained in the polynomial.

$6x^3 + 4y^2 - y^1 + 2$

Degree of Polynomial = 3

$3y^4 - 4y^2x^2z^1 - z^2 + 2x^1$

Degree of Polynomial = 5

- **Writing a Polynomial (STANDARD FORM)**
  1. Order terms from highest to lowest degree.
  2. If degree is the same, alphabetize by variable with highest degree.

$$-4x^2y^2z + 3y^4 - z^2 + 2x$$

Naming Polynomials (by Degree)

- **Linear:** Polynomial of degree 1.
- **Quadratic**: Polynomial of degree 2.
- **Cubic**: Polynomial of degree 3.
- **Fourth Degree**…: Polynomial of degree 4…

Polynomial	Degree (by Exponents)	Name by Degree	# of Terms (by +/-)	Name by Terms
$7x+4$		**Linear**		**Binomial**
$3x^2+2x+1$		**Quadratic**		**Trinomial**
$4x^3$		**Cubic**		**Monomial**
$9x^4+11x$		**Fourth Degree**		**Binomial**
5		**Constant**		**Monomial**

Adding and Subtracting Polynomials

- **It's Simple!** **Add/Subtract "Like Terms"**

- **It is useful to write the polynomials with like terms in same columns – like you do with "ordinary" numbers.**

$$(5x^2 + 6x - 8) + (4x^2 - 3)$$

$$\begin{array}{rrr} 5x^2 & +6x & -8 \\ +\ 4x^2 & & -3 \\ \hline 9x^2 & +6x & -11 \end{array}$$

Subtracting Polynomials

- **<u>Be Careful</u> with the subtraction (-) and Negative Signs!!!**

$$(5x^2 - 3x - 4) - (2x^2 - 5x + 6)$$

$$\begin{array}{rrr} 5x^2 & -3x & -4) \\ -(2x^2 & -5x & +6) \\ \hline 3x^2 & +2x & -10 \end{array}$$

Practice

- **Try adding/subtracting the following:**

$$(4x+2)+(3x-1)$$

$$(5x^2+8)+(3x^2+1)$$

$$(4x^2+2x+8)+(3x^2-x+1)$$

$$(2x+8)-(x+1)$$

$$(6x^2+2x+8)-(3x^2-x+1)$$

Math 2 – Daily Summary

- **Announcements**
  - **Welcome Back!**
- **Class Objectives – *What Should You Learn?***
  - Terminology & Symbolic Representation for Circles:
    - Circle: Center & Radius
    - Congruent Circles, Concentric Circles
    - Arc of a Circle, Endpoints
    - Semicircle, Major Arc, Minor Arc
    - Chord, Diameter
    - Secant, Tangent, Point of Tangency
    - Inscribed Angle, Central Angle
- **Assignment**
  - **Lesson 7.1**: 1-15

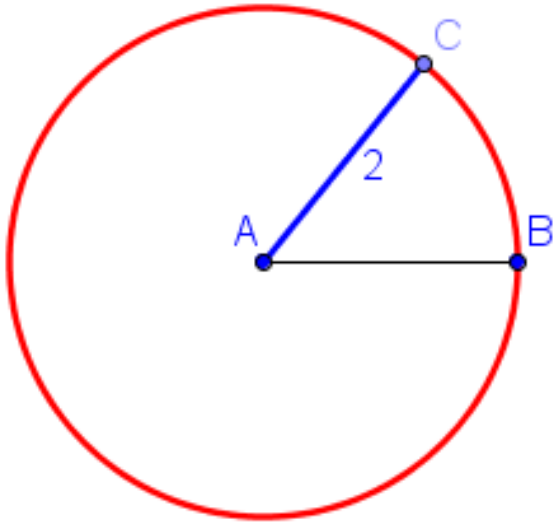
What do You Know About **Circles**?

- **What - Characteristics?**

- **Where - Occurrences?**

Circle: Center and Radius

- **Circle**
  - A circle is the set of all points in a plane at a given distance from a given point.
- **Radius**
  - The “given distance”. The distance from any point on the circle to the center.
  - Any two radii of a circle are congruent.
- **Center**
  - The “given point”.
  - **Name a Circle by its Center (Point)**



Circle A

$\overline{AC}$ is a radius

$AC = AB = 2$

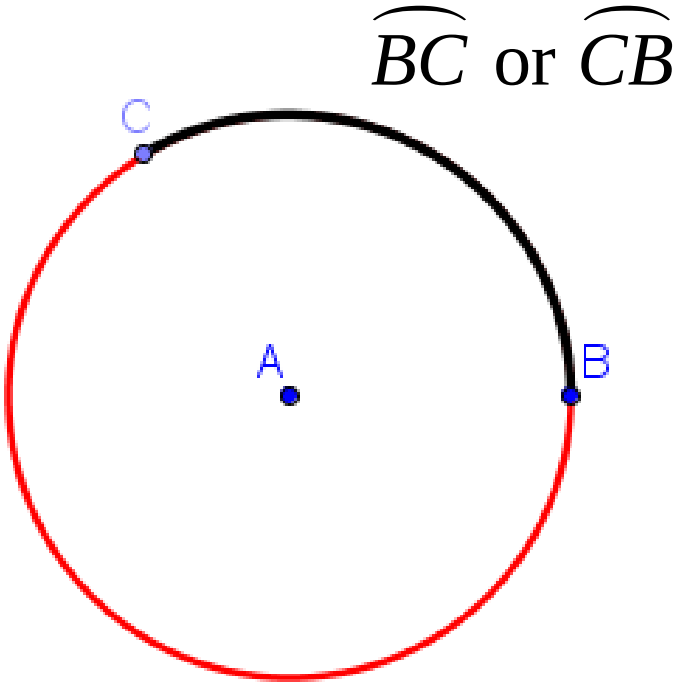
Congruent & Concentric Circles

- **Congruent Circles**
  - Two circles that have the same radius.

- **Concentric Circles**
  - Two or more coplanar circles that have the same center.

Arcs of a Circle

- **Arc of a Circle**
  - An arc of a circle consists of <u>two points</u> (**Endpoints**) on the circle and the <u>continuous (unbroken) part of the circle between the points</u>.



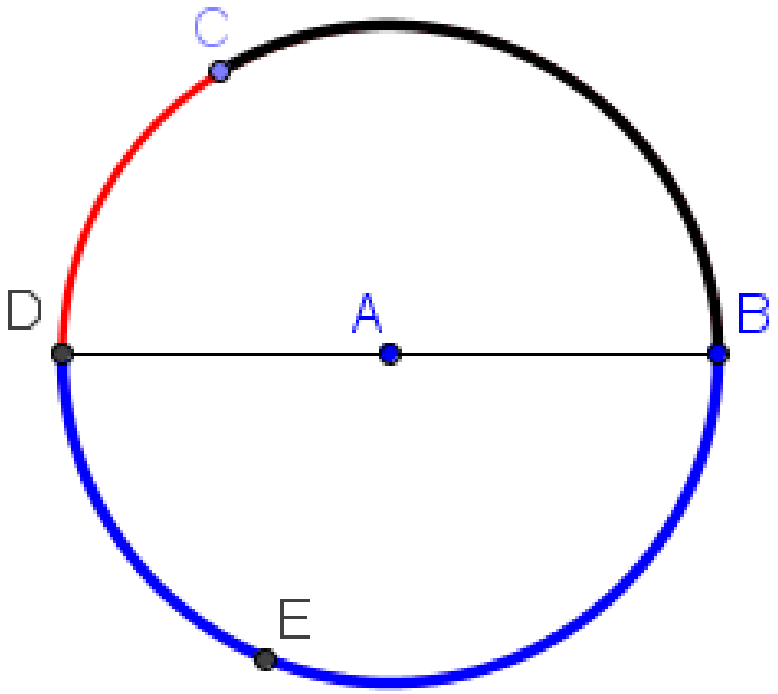
- **Symbolic Form of an Arc**

$$\overset{\frown}{BC} \text{ or } \overset{\frown}{CB}$$

where A and B are endpoints.

Arcs: Minor, Major & Semicircle

- **Arcs are classified into 3 types:**
  - **Semicircle:** $\overset{\frown}{DEB}$
    - An arc whose endpoints are the endpoints of a diameter.
    - ***Need 3 Points to Name!***
  - **Minor Arc:** $\overset{\frown}{DC}$
    - An arc that is less than a semicircle.
  - **Major Arc:** $\overset{\frown}{DBC}$
    - An are that is more than a semicircle.
    - ***Need 3 Points to Name!***



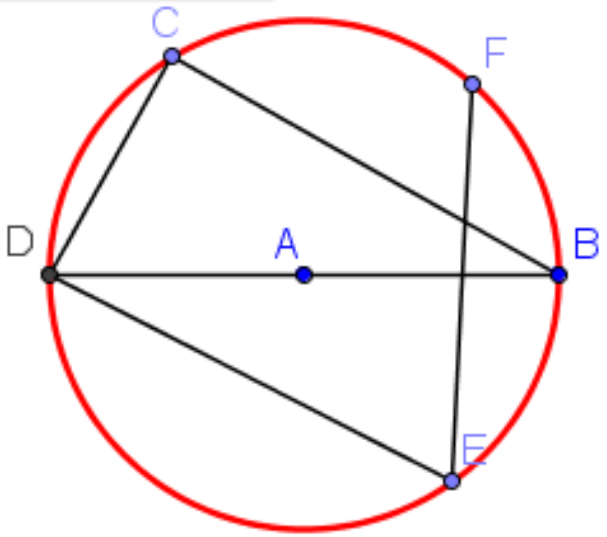
Chord & Diameter

1. What type of object?
2. What is unique?

- **Chord:**

Chords

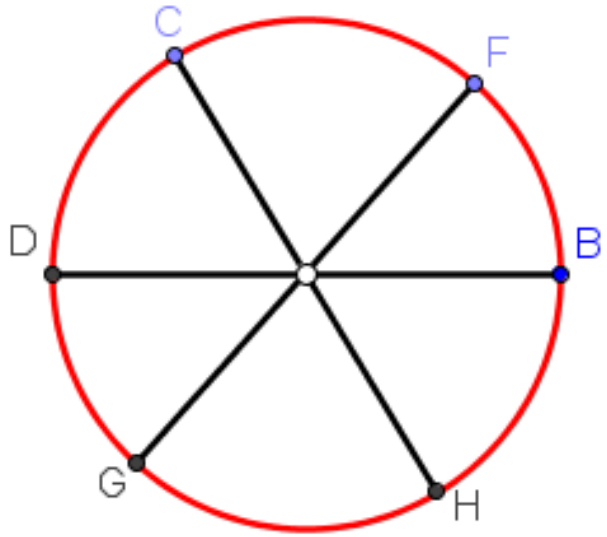
$\overline{CD}, \overline{CB}, \overline{DB}, \overline{DE}, \overline{FE}$



- **Diameter:**

Diameters

$\overline{CH}, \overline{DB}, \overline{GF}$



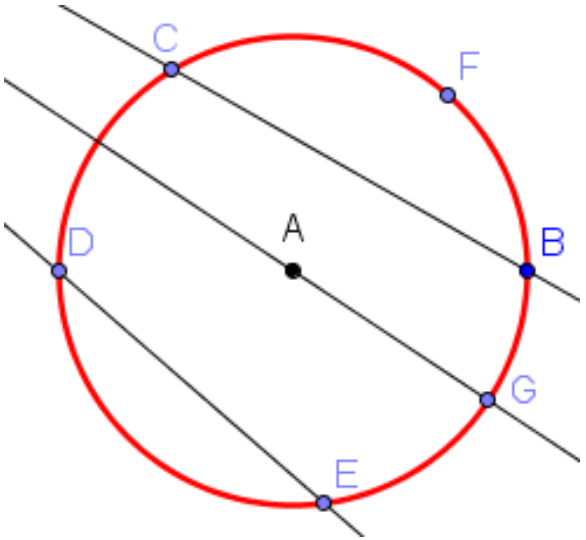
Secant & Tangent

1. What type of object?
2. What is unique?

- **Secant:**

Secants

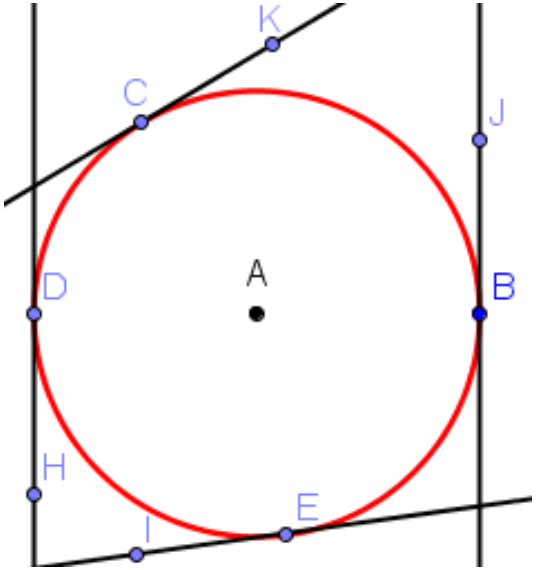
$\overleftrightarrow{DE}, \overleftrightarrow{AG}, \overleftrightarrow{CB}$



- **Tangent:**

Tangents

$\overleftrightarrow{CK}, \overleftrightarrow{BJ}, \overleftrightarrow{EI}, \overleftrightarrow{DH}$



  - **<u>Point of Tangency</u>** (Points C, B, E, D)

Inscribed Angles & Central Angle

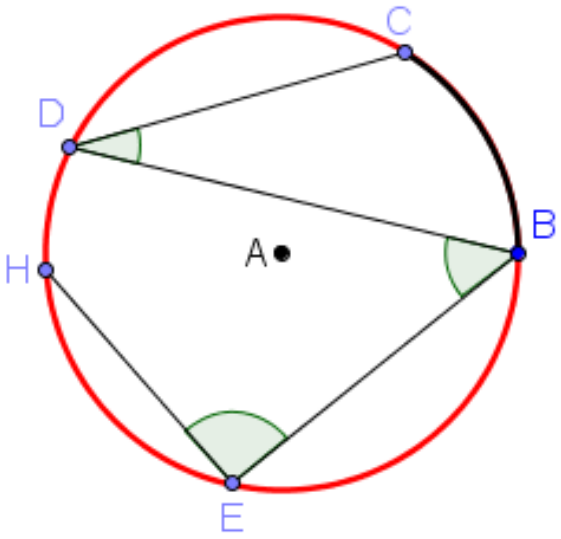
- **Inscribed Angle:**

Inscribed Angles

$\angle BDC, \angle DBE, \angle BEH$

Intercepted Arcs

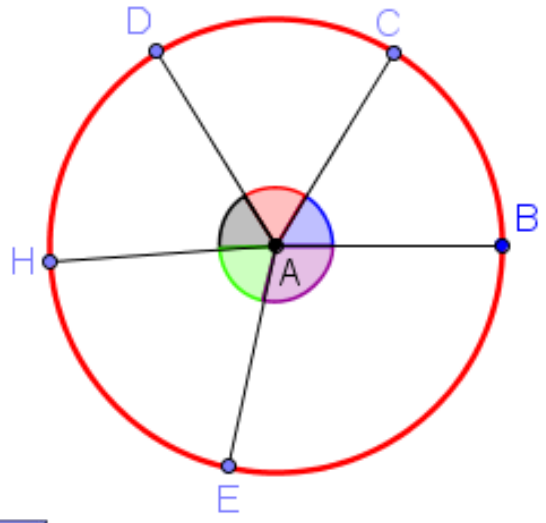
$\overset{\frown}{BC}, \overset{\frown}{DE}, \overset{\frown}{BH}$



- **Central Angle:**

Central Angles

$\angle BAC, \angle CAD, \angle DAH, \ldots$



1. What type of object?
2. What is unique?

(Formal) Definitions for New Terms

- **Chord:** A segment whose endpoints lie on the circle.
- **Diameter:** A chord that contains the center of the circle.
- **Secant:** A line that intersects the circle at exactly 2 points.
- **Tangent:** A line that intersects the circle at exactly 1 point.
- **Point of Tangency:** The point where a tangent intersects the circle.
- **Inscribed Angle:** An angle whose vertex lies on the circle, and whose sides intersect the circle at two other points.
- **Central Angle:** An angle whose vertex lies at the center of the circle.

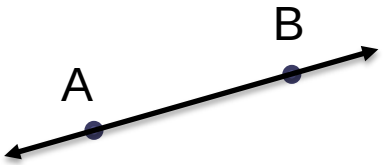
Applied Math – Daily Summary

- **Announcements**
  - **Welcome Back!**
- **Class Objectives – *What Should You Learn?***
  - Lines, Segments & Rays: Geometric & Symbolic Forms
  - Angles: Vertex, Sides, Symbolic Notation, Measure
  - Angle Types: Acute, Obtuse, Right
  - Intersecting, Parallel, Perpendicular Lines
  - Complementary, Supplementary & Vertical Angles
  - Transversals of Parallel Lines: Angle Relationships
  - Polygons: Classify by # of Sides
- **Assignment**
  - **Section 12.1**: 2-36 EVEN

“Building Blocks” of Geometry

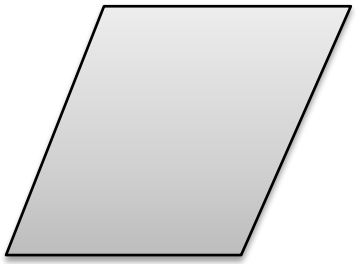
- **The Building Blocks of Geometry:**
  - Point:
    - Basic unit.
    - It has no size and is infinitely small.

  - Line:
    - A straight arrangement of points.
    - Infinitely many points on a line.
    - Infinite length…extends forever in two directions.
    - Name with two points on the line.



$\overleftrightarrow{AB}$

  - Plane:
    - Has length and width but no thickness.
    - A flat surface that extends forever.
    - Represent with a 4-sided figure



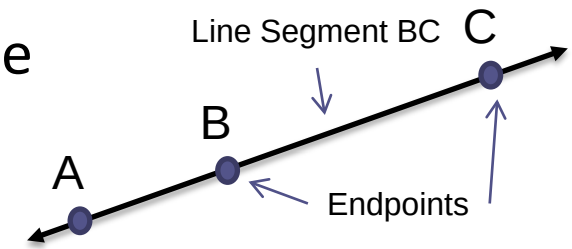
Space, Line Segment & Ray

- **Space**
  - The set of **ALL** points.

- **Line Segment (& Endpoints)**
  - Two points (called endpoints) and all of the points between them that lie on the line containing the two points.

- **Ray**
  - The part of line AB that contains point A and all the points on line AB that are on same side of point A as point B.

$\overleftrightarrow{AB}, \overleftrightarrow{AC}, \overleftrightarrow{BC}$



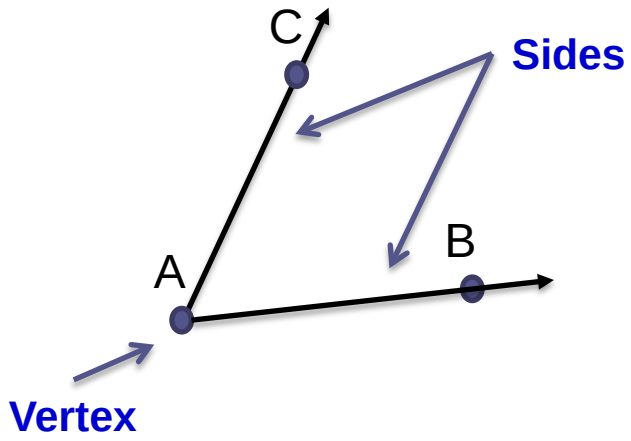
$\overline{AB}, \overline{BC}, \overline{AC}$

$\overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{BC}, \overrightarrow{CA}, \overrightarrow{BA}$

Not the Same!

Angle Definition

- **Angle**
  - Two rays that share a common endpoint, provided the two rays do not lie on the same line.



Sides = _____

Vertex = _____

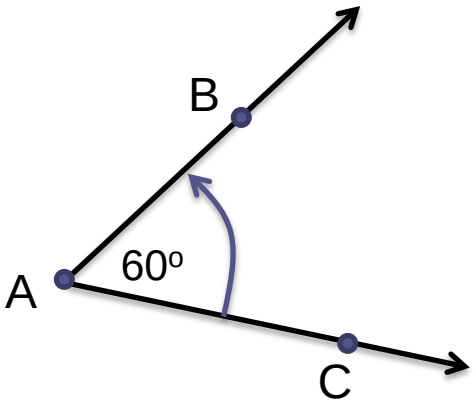
Name an Angle with 3 Points with vertex as middle point. Or, a single letter/number if unambiguous.

Angle CAB or Angle BAC or Angle A

$$\angle BAC \quad \angle CAB \quad \angle A$$

Angle Measure

- **Measure of an Angle / Angle Measure:**
  - The smallest amount of rotation of a side (ray) from the overlapping position to the final angle.
- **We will begin by measuring angles in <u>DEGREES</u> (for example, 56º) (introduce <u>RADIANS</u> in later section)**

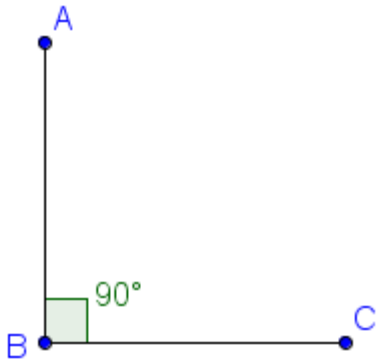


How do we write it?

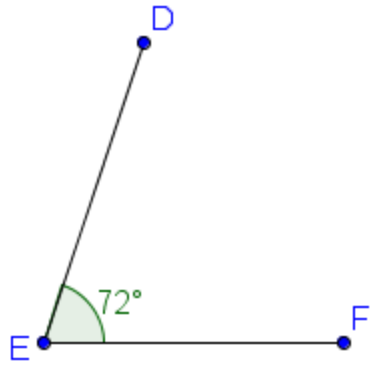
$$m\angle A = 60°$$

Angle Types

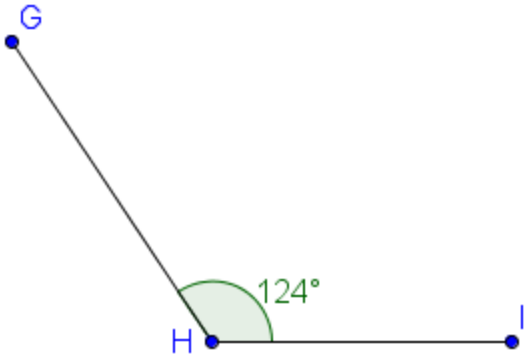
- **Right Angle**
  - An angle with a measure of 90º.



- **Acute Angle**
  - An angle with a measure < 90º.

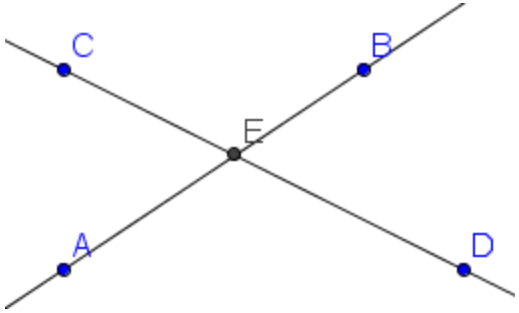


- **Obtuse Angle**
  - An angle with a measure > 90º.

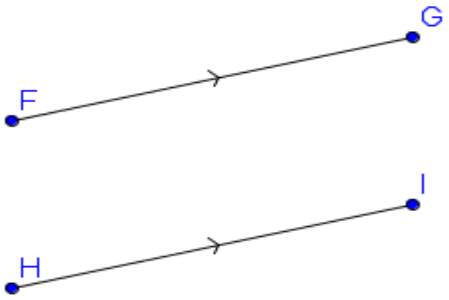


Intersecting, Parallel & Perpendicular

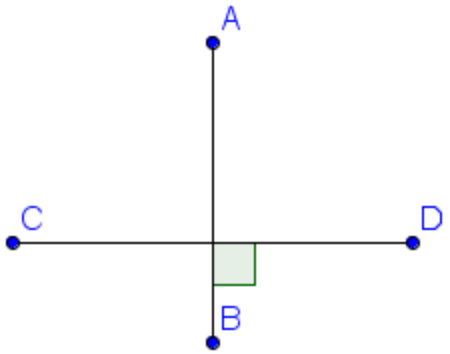
- **Intersecting Lines**
  - Two lines that have one point in common.



- **Parallel Lines**
  - Two lines that do not intersect.

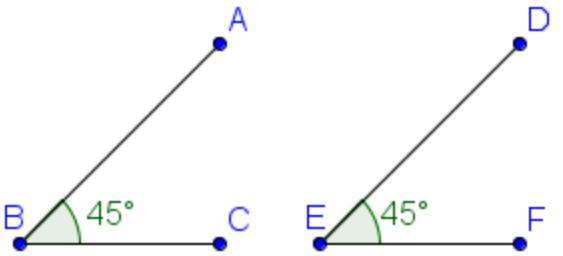


- **Perpendicular Lines**
  - Two intersecting lines that create right angles (90^{o})

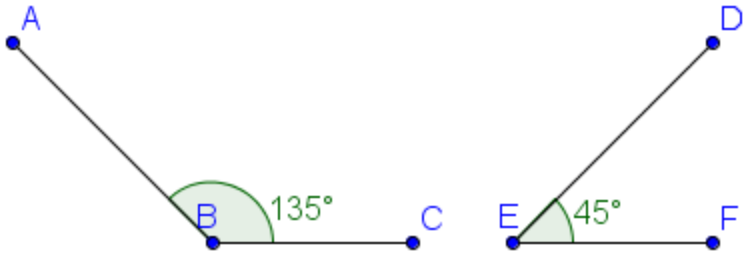


Pairs of Angles

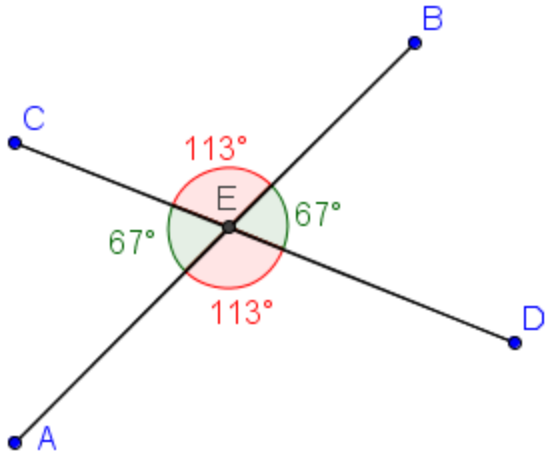
- **Complementary Angles**
  - Two angles whose sum is 90º.



- **Supplementary Angles**
  - Two angles whose sum is 180º.

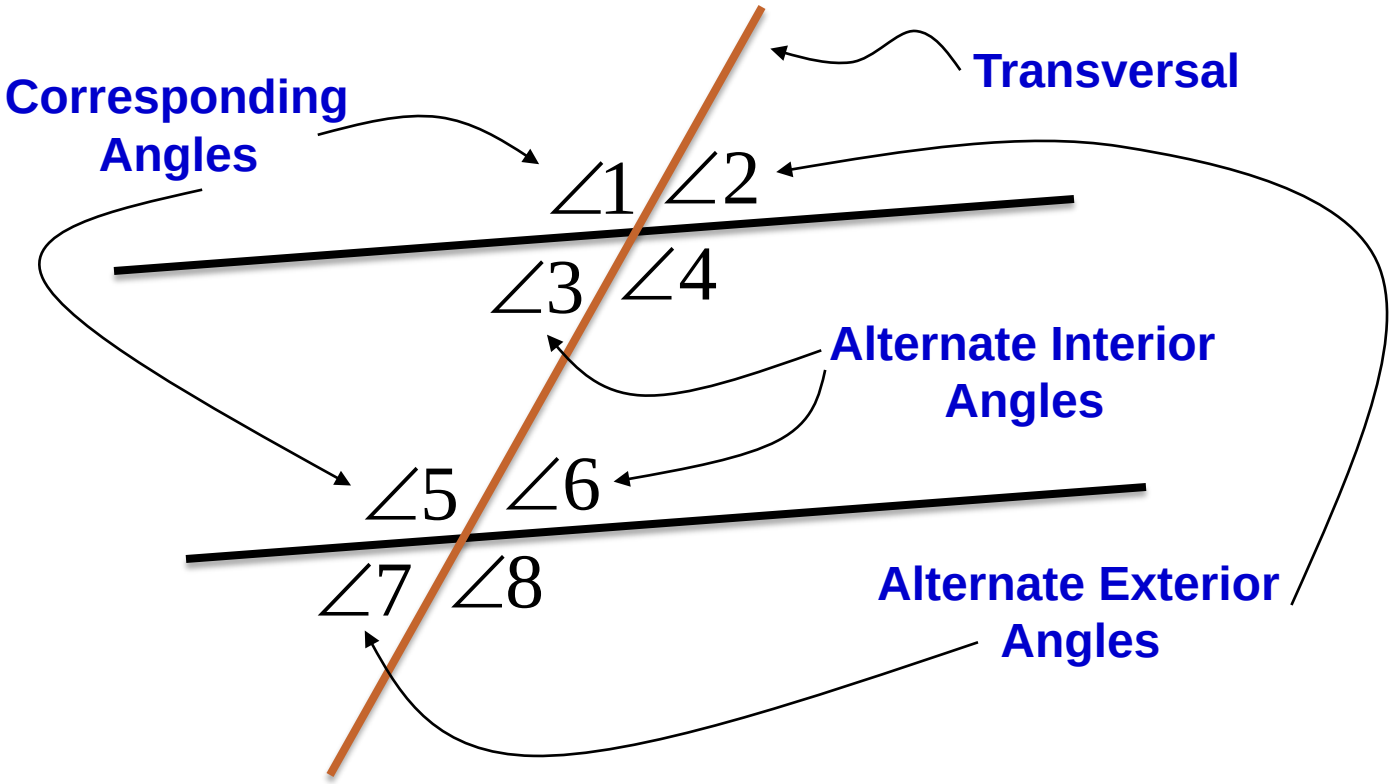


- **Vertical Angles**
  - A pair of angles opposite each other created by intersecting lines.
  - The angles in the pair are <u>congruent</u>.



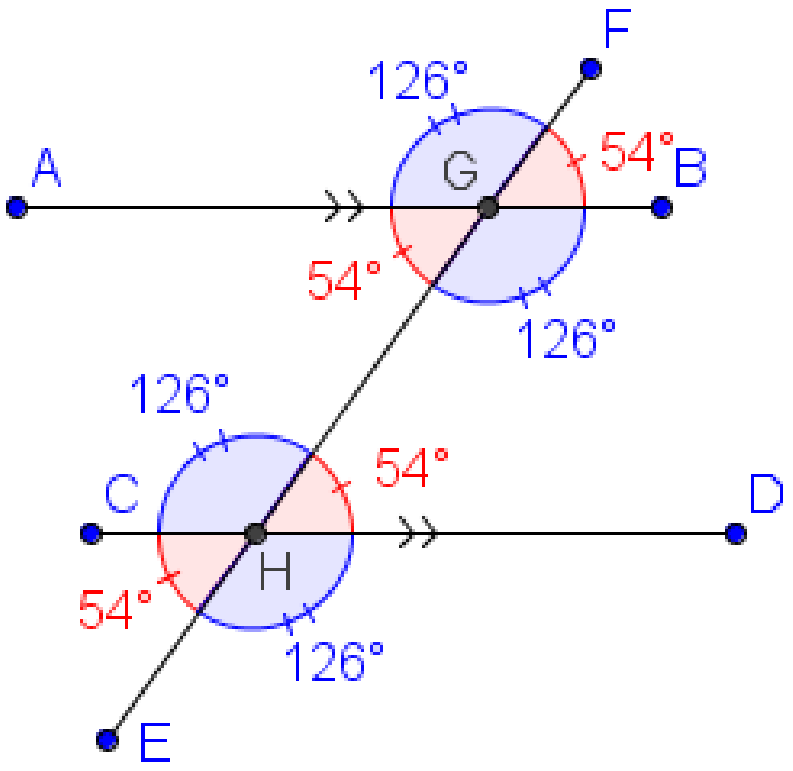
Transversal – Angle Pairs

- **Transversal**
  - A line intersecting two or more other coplanar lines.



Transversal – Parallel Lines

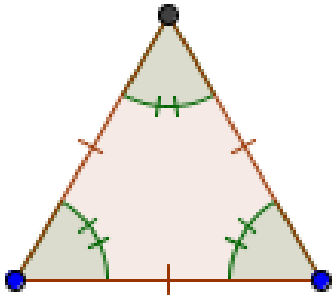
- **If two parallel lines are cut by a transversal, then corresponding, alternate interior, and alternate exterior angles are congruent.**



Polygons – Naming by # of Sides

- **Polygon:**
  - A closed figure whose sides are line segments.

# of Sides	Name
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon
8	Octagon
9	Nonagon



Regular Polygon:
All sides and interior angles are equal.