HW #1 (submitted Friday, 11/7)
- Read Ch 1 & Ch 2
- **Ch 1 Review Problems pp. 36-38**
- Start working on Geometry badge on Khan Academy;
  make sure you've added me as a coach using code listed on brewermath.com!

HW #2 (submitted Friday, 11/14)
- Read Ch 3 & Ch 4
- **Ch 2 Review Problems pp. 71-74**
- **Ch 3 Review Problems pp. 124-128**
- Khan Academy exercises:
- "Introduction to Euclidean geometry"
- "Angles and intersectinglines"

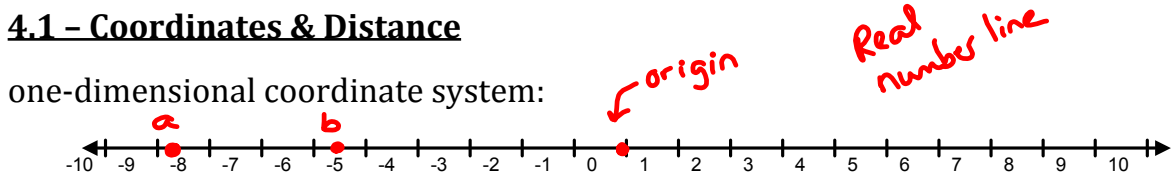
Upcoming:
Monday: Ch 4
Tuesday: Review, finish Ch 4
Test #1 (Chapters 1-4) - Wednesday, 11/19
Friday - Ch 5

HW #3 (**due Friday, 11/21**)
- Read Ch 4 & Ch 5
- Ch 4 Review Problems pp.176-180
- Khan Academy exercises: "Congruence"

Chapter 4 – Congruence

4.1 – Coordinates & Distance

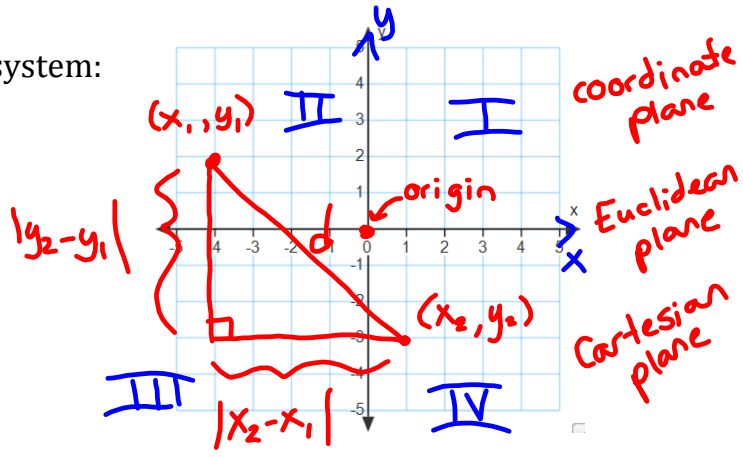
one-dimensional coordinate system:



distance between a & b
$= |a-b| = |b-a|$

two-dimensional coordinate system:

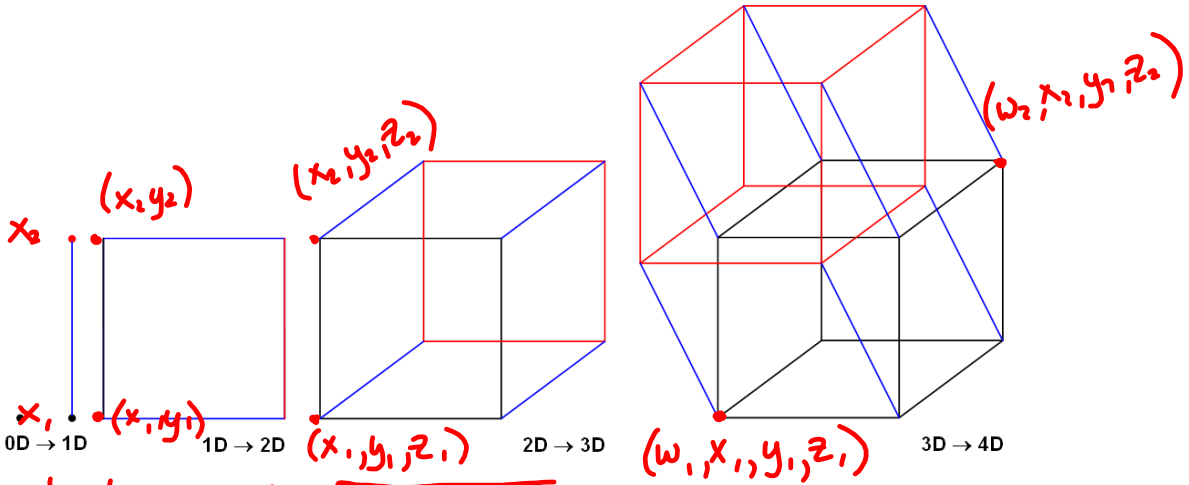
Origin, axes, quadrants, coordinates



Distance formula:

The distance between the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ is

$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2}$



1D $d = |x_1 - x_2| = \sqrt{(x_1 - x_2)^2}$

2D $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

3D $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$

4D $d = \sqrt{(w_2 - w_1)^2 + (x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$

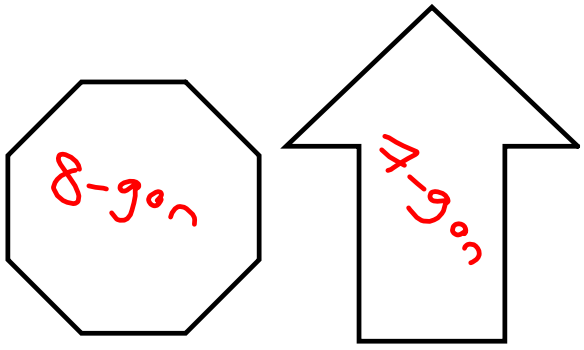
ND $d = \sqrt{(a_2 - a_1)^2 + \cdots + (z_2 - z_1)^2}$ (n coordinates)

4.2 – Polygons and Congruence

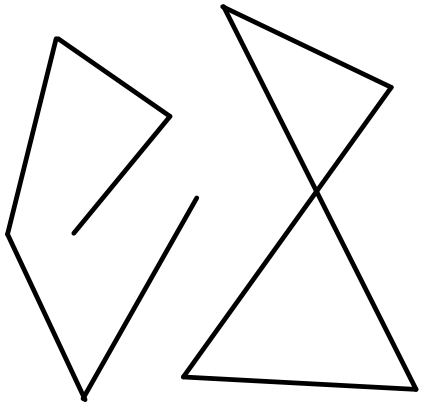
Def: A polygon is a connected set of at least three line segments in the same plane such that each segment intersects exactly two others, one at each endpoint.

The line segments are the sides of the polygon, and the endpoints are its vertices. The number of sides and vertices is always the same, and the polygon is referred to as an "*n*-gon" if it has *n* sides and *n* vertices.

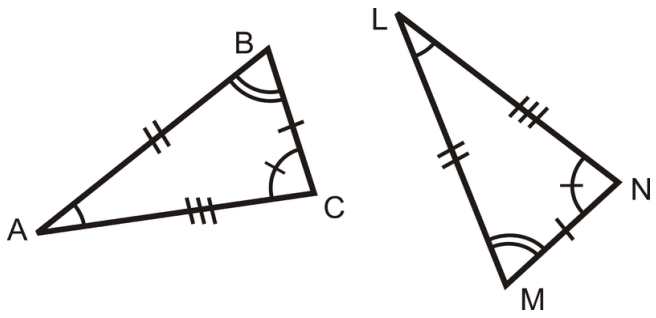
Polygons:



Not Polygons:



Def: Two triangles are congruent iff there is a correspondence between their vertices such that all of their corresponding sides and angles are equal.



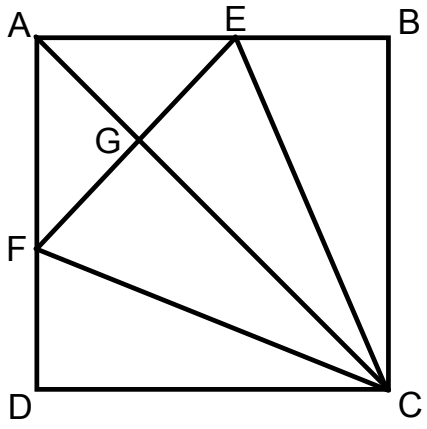
$\Delta ABC \cong \Delta LMN$

$\cong$ means "is congruent to"

$ABC \leftrightarrow LMN$

$a \rightarrow b$ implies

$a \leftrightarrow b$ iff



Name the triangles that appear to be congruent to the following triangles.

12. ΔAFG $\cong \Delta AEG$

13. ΔACD $\cong \Delta ACB$

14. ΔCDF $\cong \Delta CBE$

15. ΔACE $\cong \Delta ACF$

16. Name a triangle that is not congruent to any other triangle in the figure.

ΔAFE, ΔFEC

Corollary to the definition of congruent triangles: Two triangles congruent to a third triangle are congruent to each other.

55. Give the reasons for the statements in the proof.

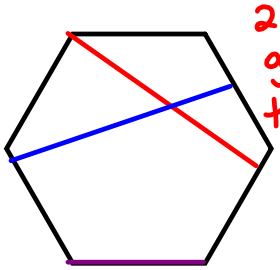
Given: $\Delta ABC \cong \Delta XYZ$ and $\Delta DEF \cong \Delta XYZ$

Prove: $\Delta ABC \cong \Delta DEF$

Proof:

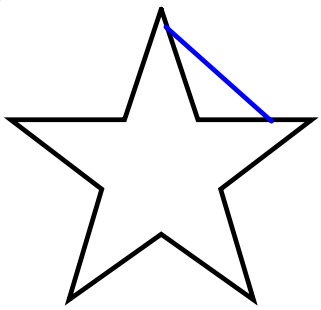
Statements	**Reasons**
1. $\Delta ABC \cong \Delta XYZ$ and $\Delta DEF \cong \Delta XYZ$	Given / hypothesis
2. $\angle A = \angle X,\ \angle B = \angle Y, \angle C = \angle Z$ $AB = XY, BC = YZ, AC = XZ$ $\angle D = \angle X,\ \angle E = \angle Y, \angle F = \angle Z$ $DE = XY, EF = YZ, DF = XZ$	Corresponding parts of congruent triangles are equal
3. $\angle A = \angle D,\ \angle B = \angle E, \angle C = \angle F$ $AB = DE, BC = EF, AC = DF$	Substitution
4. $\Delta ABC \cong \Delta DEF$	Def of congruent triangles

Convex



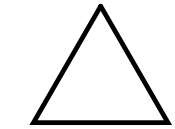
a line connecting 2 points never goes outside the polygon

Concave

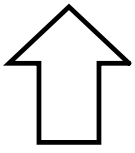


there exists at least one set of points such that a line connecting them must travel outside the polygon

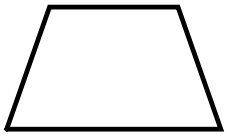
Convex or concave?



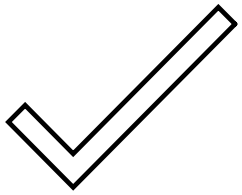
Convex



concave



convex

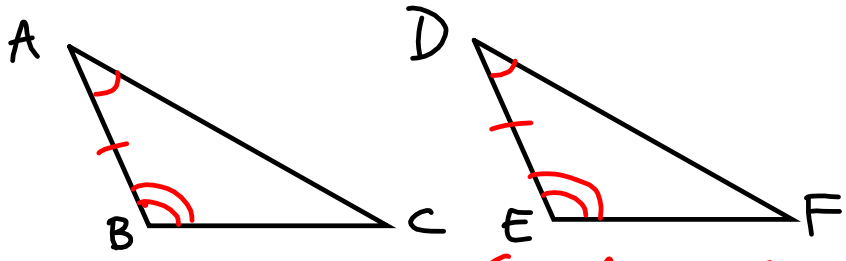


Concave

4.3 – ASA and SAS Congruence

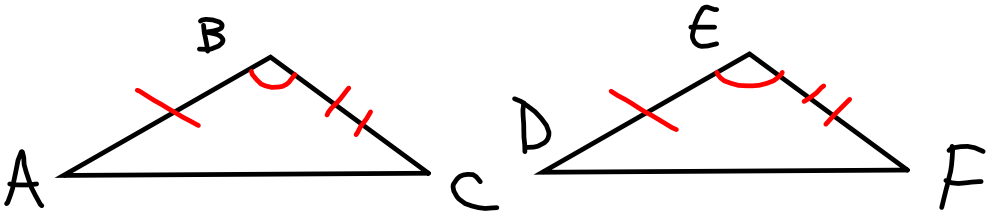
Postulate 5: The ASA Postulate Angle Side Angle

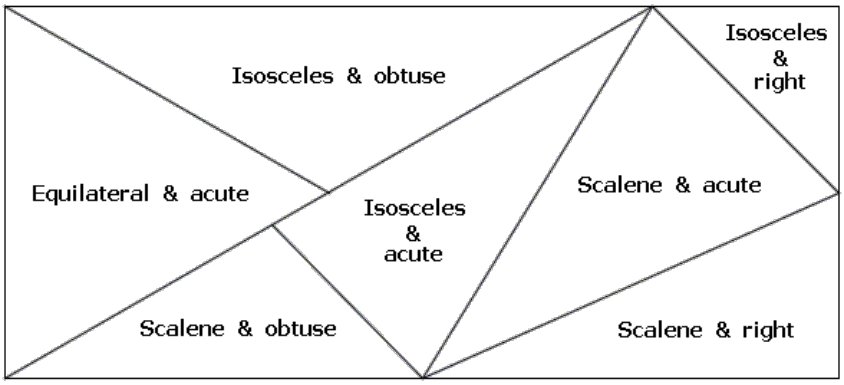
If two angles and the included side of one triangle are equal to two angles and the included side of another triangle, the triangles are congruent.



Postulate 6: The SAS Postulate Side Angle Side

If two sides and the included angle of one triangle are equal to two sides and the included angle of another triangle, the triangles are congruent.



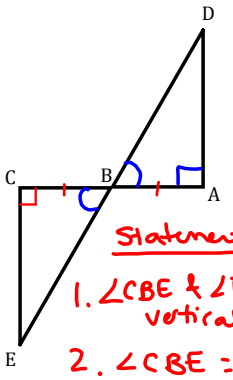


16. Equilateral – all sides same length, all angles same measure
17. Acute – all angles strictly less than 90°
18. Isosceles – 2 sides equal, 2 (opposite) angles equal
19. Obtuse – contains one angle strictly greater than 90°
20. Scalene – all sides different lengths, all angles different measures
21. Right – contains one angle exactly 90°

4.4 – Congruence Proofs

Def: Corresponding parts of congruent triangles are equal.

⊥ "is perpendicular to"



Given: $CA \perp AD, CB = BA,$
$\angle C$ *is a right angle and*
$\angle CBE$ *and* $\angle DBA$ *are vertical angles.*

Prove: $CE = AD$

Proof:

Statements	Reasons
1. ∠CBE & ∠DBA are vertical angles	Given
2. ∠CBE = ∠DBA	vertical angles are equal
3. CA ⊥ AD	Given
4. ∠A is a right angle	Perpendicular lines meet @ right angles
5. CB = BA	Given
6. ∠C is a right angle	Given
7. ∠A = ∠C	All right angles are equal
8. △BCE ≅ △BAD	ASA
9. CE = AD	Corresponding parts of congruent triangles are equal