Distance Formula

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

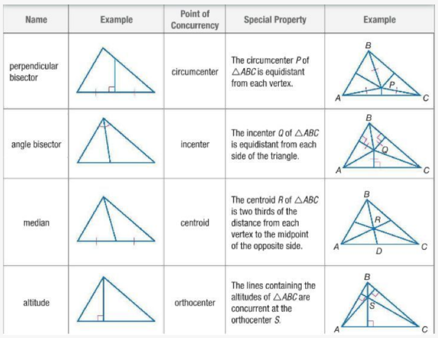
Slope Formula

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \text{ where } x_2 \neq x_1$$

Midpoint Formula

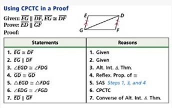
$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Types of Triangles



Name	Example	Point of Concurrency	Special Property	Example
perpendicular bisector		circumcenter	The circumcenter P of $\triangle ABC$ is equidistant from each vertex.	
angle bisector		incenter	The incenter Q of $\triangle ABC$ is equidistant from each side of the triangle.	
median		centroid	The centroid R of $\triangle ABC$ is two thirds of the distance from each vertex to the midpoint of the opposite side.	
altitude		orthocenter	The lines containing the altitudes of $\triangle ABC$ are concurrent at the orthocenter S.	

Proof



Using CPCTC in a Proof

Given: $\overline{EG} \parallel \overline{DF}$, $\overline{EG} \cong \overline{DF}$
Prove: $\overline{ED} \parallel \overline{GF}$
Proof:

Statements	Reasons
1. $\overline{EG} \cong \overline{DF}$	1. Given
2. $\overline{EG} \parallel \overline{DF}$	2. Given
3. $\angle EGD \cong \angle FDG$	3. Alt. Int. ∠s Thm.
4. $\overline{GD} \cong \overline{GD}$	4. Reflex. Prop. of ≅
5. $\triangle EGD \cong \triangle FDG$	5. SAS Steps 1, 3, and 4
6. $\angle EDG \cong \angle FGD$	6. CPCTC
7. $\overline{ED} \parallel \overline{GF}$	7. Converse of Alt. Int. ∠s Thm.

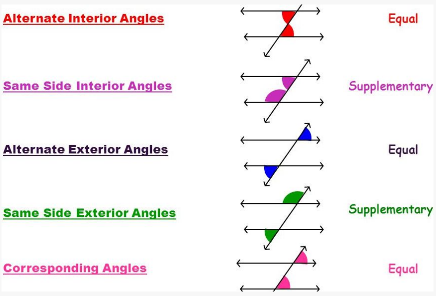
Terms

Acute Angle	Less than 90°
Adjacent Angle	Two angles on the same plane
Collinear Points	Two points on the same line
Complementary Angle	Two angles whose sum is 90°
Midpoint	The point halfway between the endpoints of a segment.
Obtuse Angle	More than 180°
Ray	A point on a line and all points in one direction

Terms (cont)

Vertical Angles	Two nonadjacent angles formed by two intersecting lines
Linear Pair	Adjacent angles whose non-common sides are opposite rays
Isoscles	At least two sides are congruent
Scalene	Nothing is congruent
Equila-teral	Every side is the same length
Bicond-itional	A and B are bi conditionally related if A implies B and B implies A.
Counte-rexample	a number which disproves a proposition For example, the prime number 2 is a counterexample to the statement "All prime numbers are odd."
Isometry	A isometry is a transformation where distance (aka size) is preserved.
Preimage	Produced by reflection from a mirror, refraction by a lens, or the passage of luminous rays through a small aperture and their reception on a surface.
Transl-ation	A transformation in which a graph or geometric figure is picked up and moved to another location without any change in size or orientation.

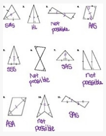
Types of Angles



Pythagorean Theorem

$$a^2 + b^2 = c^2$$

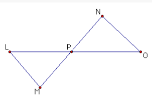
Congruent Angles



Reflections

TYPE OF REFLECTION	Point of the pre-image (Before reflection)	Point of the image (After reflection)
Reflection about the x- axis	(x, y)	(x, -y)
Reflection about the y-axis	(x, y)	(-x, y)
Reflection about the line y = x	(x, y)	(y, x)
Reflection about the line y = -x	(x, y)	(-y, -x)
Reflection about the origin	(x, y)	(-x, -y)

Proof



Given:
P is the midpoint of $\overline{LO}$ and $\overline{MN}$.
Show that $\overline{LM} \parallel \overline{NO}$.

Statements	Reasons
1. P is the midpoint of both $\overline{LO}$ and $\overline{MN}$.	1. Given
2. $\overline{LP} \cong \overline{PO}$, $\overline{MP} \cong \overline{PN}$	2. Definition of Midpoint
3. $\angle NPO \cong \angle LPM$	3. Vertical angles are congruent.
4. $\triangle LPM \cong \triangle OPN$	4. SAS Congruence Postulate
5. $\angle MLP \cong \angle NOP$	5. CPCTC
6. $\overleftrightarrow{LM} \parallel \overleftrightarrow{NO}$	6. Converse of Alternate Interior Angles Theorem
7. $\overline{LM} \parallel \overline{NO}$	7. Segments of parallel lines are parallel.

Properties

Name	Property of Equality
Addition Property	If $a = b$, then $a + c = b + c$
Subtraction Property	If $a = b$, then $a - c = b - c$
Multiplication Property	If $a = b$, then $ac = bc$
Division Property	If $a = b$, then $a/c = b/c$
Reflexive Property	For any real #, $a = a$
Symmetric Property	If $a = b$, then $b = a$
Transitive Property	If $a = b$ and $b = c$, then $a = c$
Substitution Property	If $a = b$, then b can be substituted in for a