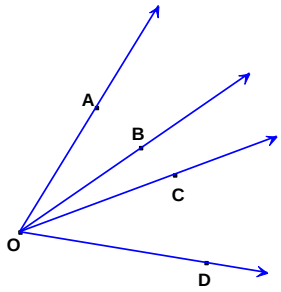
Chapter 1

acute angle *(A), (G)* An angle whose measure is greater than 0° and less than 90°.

adjacent angles *(A), (G), (A2T)* Two coplanar angles that share a common vertex and a common side but have no common interior points.

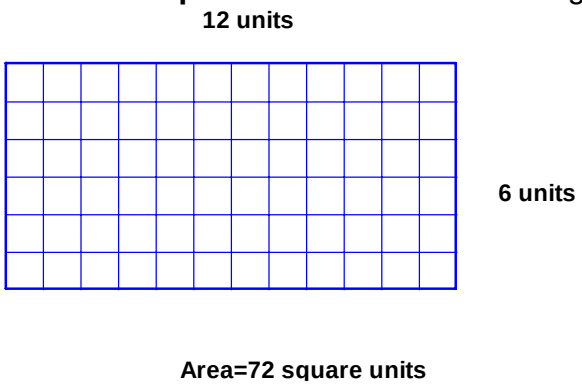
Example: In the figure below, $\angle AOB$ and $\angle BOC$ are a pair of adjacent angles, but $\angle AOC$ and $\angle BOD$ are not adjacent.



angle measure *(G)* The number of degrees or radians in an angle.

area of a polygon *(G)* The unique real number assigned to any polygon which indicates the number of non-overlapping square units contained in the polygon's interior.

Example: The area of the rectangle shown is 72 square units.



axiom *(G)* A statement that is accepted without proof.

collinear points *(G)* Points that lie on the same line.

complementary angles *(G)* Two angles the sum of whose measures is 90 degrees.

congruent *(G)* Having the same size and shape.

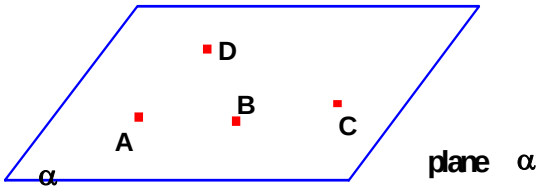
Example: Two *line segments* are congruent if they have the same length.
Two *angles* are congruent if the have the same measure.
Two *polygons* are congruent if their exists a one-to-one correspondence between their vertices such that their corresponding sides are congruent and their corresponding angles are congruent.

conjecture *(A) (G) (A2T)* An educated guess; an unproven hypothesis based on observation, experimentation, data collection, etc.

construct *(G)* To draw a figure using only a compass and a straightedge.

coplanar *(G)* Any three or more points that lie in the same plane.

Example: Points *A, B, C,* and *D* are coplanar



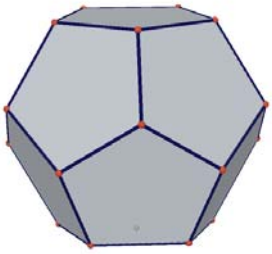
counterexample *(G) (A2T)* An example that disproves a general statement.

Example: The statement that the sum of two numbers is less than their product could be refuted by the counterexample that $2+1>2\cdot 1$.

distance between two points: *(G)* The length of the line segment joining the two points; a unique non-negative real number.

dodecahedron *(G)* A polyhedron that has twelve faces. A regular dodecahedron is one of the five Platonic solids and has twelve regular pentagons as faces.

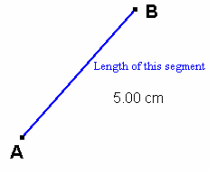
Example:



inductive reasoning *(A), (G) (A2T)* The process of observing data, recognizing patterns and making generalizations about those patterns.

length of line segment *(G)* The distance between the end two end points of a line segment.

Example:

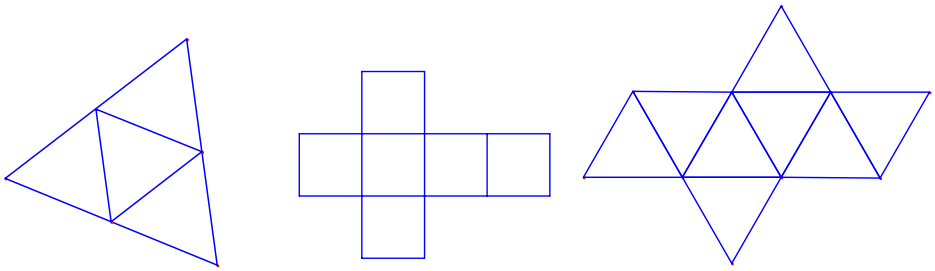


The length of $\overline{AB}$ is AB.

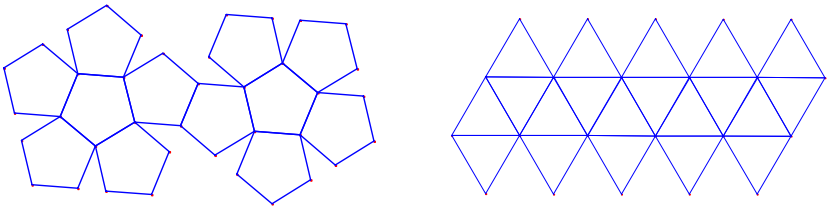
midpoint *(G)* A point that divides a line segment into two congruent line segments.

net *(G)* A two dimensional pattern consisting of polygons which can be folded to form a polyhedron.

Example: The following are the nets for the Platonic solids.



tetrahedron hexahedron (cube) octahedron



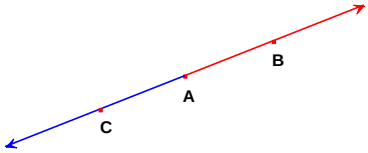
dodecahedron icosahedron

non- coplanar points *(G)* Four or more points that do not lie on the same plane.

obtuse angle *(G)* An angle whose measure is greater than 90 degrees and less than 180 degrees.

opposite rays *(G)* Two collinear rays whose intersection is exactly one point.

Example: If A is between B and C, then $\overrightarrow{AB}$ and $\overrightarrow{AC}$ are opposite rays.



parallel lines *(A) (G)* Two or more coplanar lines that do not intersect. Parallel line segments or rays are line segments or rays that are subsets of parallel lines.

parallel planes *(G)* Two or more planes that do not intersect.

perimeter *(A)* (G) The sum of the lengths of all the sides of any polygon.

perpendicular bisector (G) A line, segment or ray that is perpendicular to a line segment at its midpoint.

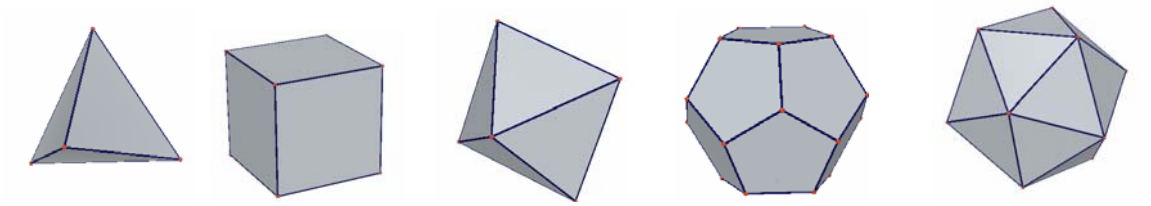
perpendicular lines *(G)* Two lines that intersect to form right angles.

perpendicular planes *(G)* Two planes that intersect to form right dihedral angles.

plane *(G)* An undefined term in geometry usually visualized as a flat surface with no thickness that extends indefinitely in two dimensions.

Platonic solids *(G)* The five regular polyhedra: tetrahedron, cube, octahedron, dodecahedron and icosahedron.

Example:

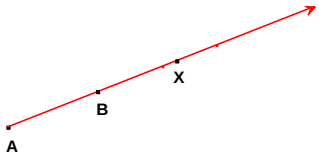


Tetrahedron Cube Octahedron Dodecahedron Icosahedron

point *(G)* An undefined term in geometry usually visualized as a dot representing a non-dimensional location in space.

postulate *(G)* A statement assumed to be true without proof.

ray *(G)* Given any two points A and B, $\overrightarrow{AB}$ is equal to the union of $\overline{AB}$ and all of those points X such that B is between X and A.



right angle *(A), (G)* An angle formed by two perpendicular lines, the measure of which is 90°.

skew lines *(G)* Two non-coplanar lines that do not intersect.

straightedge *(G)* An object with no marked units of measure that is used for drawing straight lines

supplementary angles *(G)* Two angles the sum of whose measures is 180 degrees.

vertical angles *(G)* The two nonadjacent angles formed when two lines intersect.

***x*-coordinate** *(A) (G)* The first coordinate in any (x,y) ordered pair; the number represents how many units the point is located to the left or right of the *y*-axis; also called abscissa.

***y*-coordinate** *(A) (G)* The second coordinate in any (x,y) ordered pair; the number represents how many units the point is located above or below of the *x*-axis; also called ordinate.

Chapter 2

additive property of equality *(G)* If a, b, and c are real numbers such that $a = b$, then $a + c = b + c$.

conclusion *(A) (G)* An answer or solution arrived at through logical or mathematical reasoning; the "*then*" clause in an "*if-then"* statement; the final statement in a proof which follows logically from previous true statements.

conditional *(G)* A statement formed by the conjunction of a conditional statement and its converse; a statement that can be written in "if and only if" form; a definition can always be written as a biconditional statement.

Examples:

a) $(p \to q) \wedge (q \to p)$ is the biconditional of p and q and is written $p \leftrightarrow q$.

b) An angle is a right angle if and only if it has a measure of 90 degrees. This biconditional statement is equivalent to the following two statements: If an angle is a right angle, then it has a measure of 90 degrees and if an angle has a measure of 90 degrees, then it is a right angle.

conditional statement *(G)* A statement formed from two given statements by connecting them in the form if..., then... .

Example: "If p then q" is a conditional statement (*p* implies *q*) and is denoted $p \to q$; p is called the hypothesis and q is called the conclusion.

converse of a statement *(G)* A statement formed by interchanging the hypothesis and conclusion of a conditional statement

Example: $q \to p$ is the converse of $p \to q$.

deductive proof *(G)* A formal proof based on logical argument that is justified using axioms and/or theorems.

deductive reasoning *(G)* A process of showing that certain statements follow logically from agreed upon assumptions and proven facts; reasoning from the general to the specific.

Example: Given the following true statements…

If you get a high school diploma, then you took 3 years of math.
John got his high school diploma.

Then the following conclusion can be drawn…
John took 3 years of math.

hypothesis *(G)* An assumed statement used as a premise in a proof; the "given"; the "if" clause of an "if-then" statement. (See also antecedent.)

paragraph proof *(G)* A written proof in which the statements and their corresponding reasons are written, in paragraph form, using complete sentences.

reflexive property of equality *(G)* A property of real numbers that states $a = a$.

substitution property *(A) (G) (A2T)* Any quantity can be replaced by an equal quantity.

Example: If $a + x = b$ and $x = c$ then $a + c = b$.

subtraction property of equality *(A) (G) (A2T)* If the same or equal quantities are subtracted from same or equal quantities, then the results are equal.

Example: If $a = b$ then $a - c = b - c$.

symmetric property of equality *(G)* A property of the real numbers that states: If $a = b$ then $b = a$.

theorem *(G)* A general statement that requires proof.

transitive property of equality *(G)* A property of the real numbers that states: If $a = b$ and $b = c$ then $a = c$.

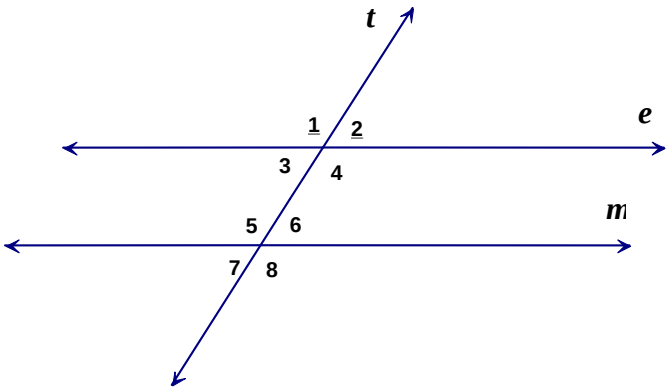
truth value *(G)* A value, (typically T or F), indicating whether a statement is true or false.

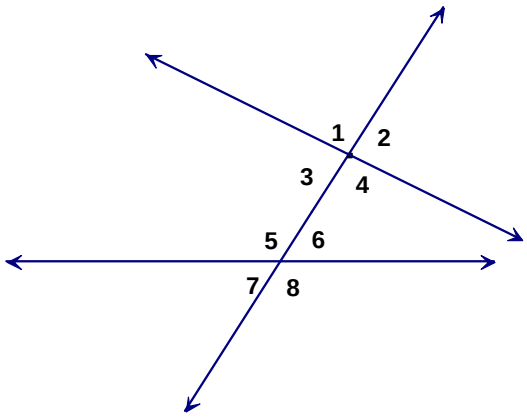
Chapter 3

acute triangle *(G)* A triangle that contains three acute angles.

alternate interior angles *(G)* Any two nonadjacent angles that lie on opposite sides of a transversal and that are interior to the lines. Note: As illustrated in the second example, the lines do *not* need to be parallel.

Example: In both diagrams below**,** $\angle 4$ and $\angle 5$, and $\angle 3$ and $\angle 6$ are pairs of alternate interior angles.

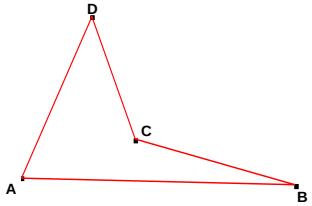




Cartesian plane *(G)* The set of all points in a plane designated by their Cartesian coordinates.

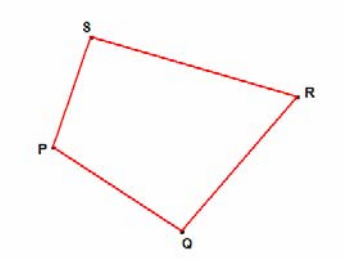
concave polygon *(G)* A polygon that has at least one diagonal outside the polygon.

Example:



convex polygon *(G)* A polygon is convex if a line segment connecting any two points of the polygon lies entirely in the polygon's interior.

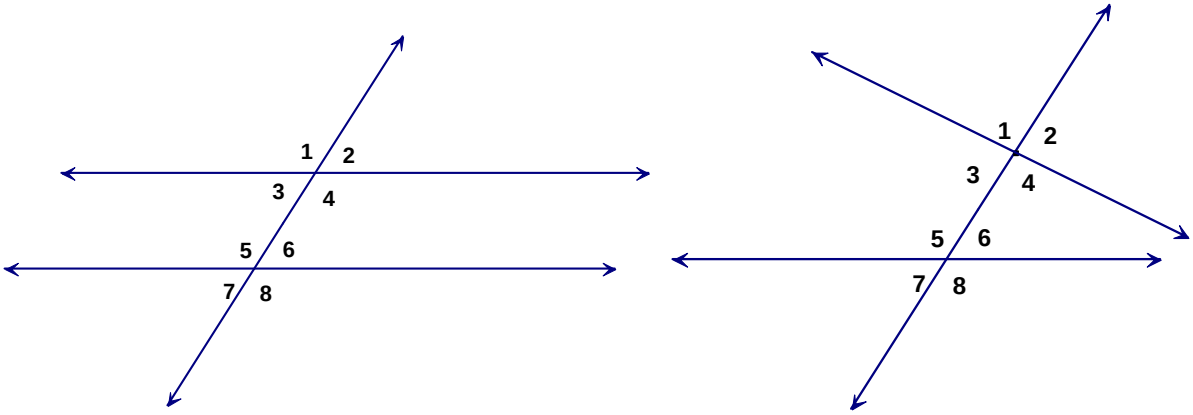
convex polygon



coordinate plane *(G)* The set of all points in a plane designated by their Cartesian coordinates. Also called the Cartesian plane.

corresponding angles *(G)* A set of angles formed on each of two or more lines cut by a transversal that are in the same position relative to each line and to the transversal. Note: As illustrated in the second example, the lines do *not* need to be parallel.

Examples: In the both diagrams below, $\angle 1$ and $\angle 5$, $\angle 2$ and $\angle 6$, $\angle 3$ and $\angle 7$, $\angle 4$ and $\angle 8$ are pairs of corresponding angles.



decagon *(A) (G)* A polygon with ten sides.

diagonal *(G)* A line segment that connects two non-consecutive vertices of a polygon.

endpoint *(G)* A point at either the end of a line segment, or arc, or the initial point of a ray.

equiangular *(G)* A polygon with all interior angles congruent.

equilateral polygon *(G)* A polygon with all sides congruent.

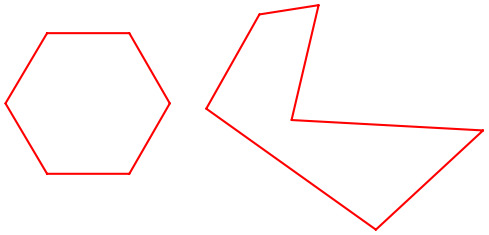
equilateral triangle *(G)* A triangle with three congruent sides.

exterior of a geometric figure *(G)* The set of all points outside a geometric figure.

exterior angle of a polygon *(G)* An angle formed by a side of a polygon and the extention of an adjacent side.

hexagon *(A), (G)* A polygon with six sides.

Examples:



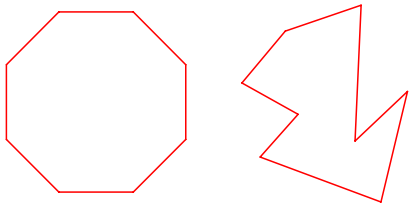
isosceles triangle *(G)* A triangle that has at least two congruent sides.

n-gon *(G)* A polygon with n sides.

obtuse triangle *(G)* A triangle having one obtuse angle.

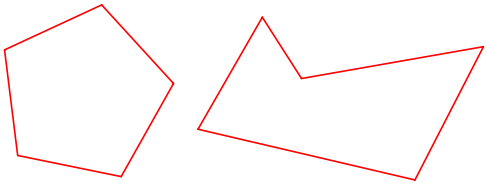
octagon *(A) (G)* A polygon with 8 sides.

Examples:



pentagon *(A), (G)* A polygon with 5 sides.

Examples:

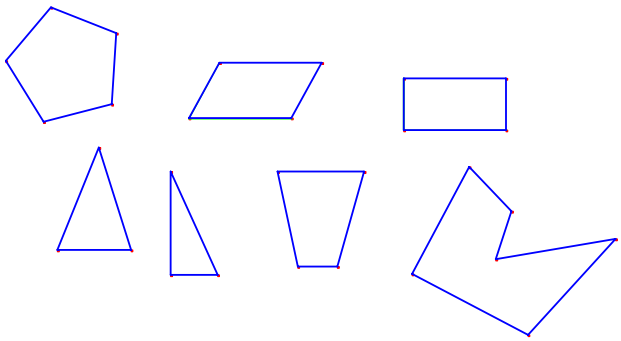


point-slope equation of a line *(G)* The equation of a line formed using its slope and the coordinates of a point on the line, where m is the slope of the line and $(x_{1,}y_1)$ are the coordinates of the given point.

Example: If the coordinates of a point on the line are (x_1, y_1) and the slope is m, then the equation of the line is $(y - y_1) = m(x - x_1)$.

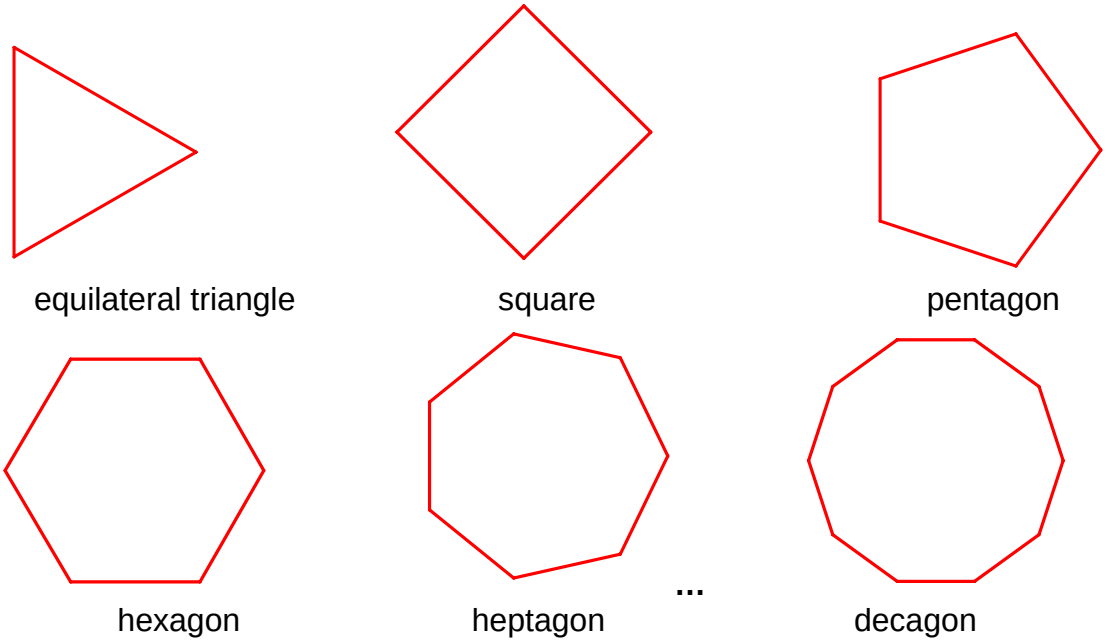
polygon *(A) (G)* A closed plane figure formed by three or more line segments that meet only at their endpoints.

Examples:

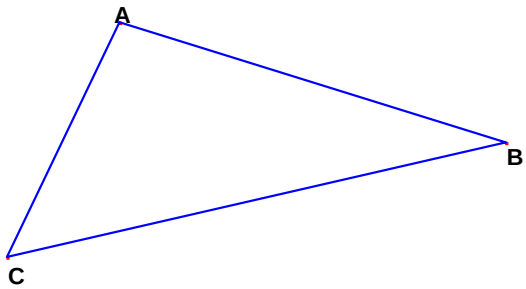


regular polygon *(A)* (G) A polygon which is both equilateral and equiangular.

Example:



remote interior angles *(G)* Either interior angle of a triangle that is not adjacent to a given exterior angle of the triangle. Also called non-adjacent interior angles.



With respect to vertex A, $\angle B$ and $\angle C$ are remote interior angles.

right triangle *(A), (G)* A triangle with one right angle.

scalene triangle *(G)* A triangle with no congruent sides

slope *(A) (G) (A2T)* The measure of the steepness of a line; the ratio of vertical change to horizontal change; if point P is (x_1,y_1) and point Q is (x_2,y_2) the slope of $\overline{PQ}$ is $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$.

Example: The slope of the line containing the points A(-3,7) and B(5, -2) is $\frac{(-2)-(7)}{(5)-(-3)} = \frac{-9}{8}$

slope - intercept equation of a line *(G)* The equation of a line formed using its slope and its y-intercept. If the coordinates of the y-intercept of the line are $(0,b)$ and the slope is m, then the equation of the line is $y = mx + b$.

transversal *(G)* A line that intersects two (or more) other lines in distinct points.

two column proof *(G)* The outline of a written proof in which the statements and their corresponding reasons are listed in two separate columns.

***x*-intercept** *(A) (G)* The point at which the graph of a relation intercepts the *x*-axis. The ordered pair for this point has a value of *y* = 0.

Example: The equation y = 8 + 2x has an *x*-intercept of -4.

***y*-intercept** *(A) (G)* The point at which a graph of a relation intercepts the *y*-axis. The ordered pair for this point has a value of *x* = 0.

Example: The equation y = 8 + 2x has a y-intercept of 8.

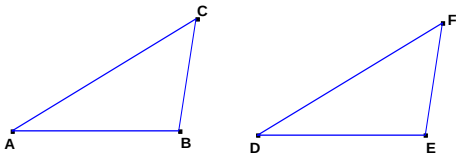
Chapter 4

AAS triangle congruence *(G)* If there exists a one-to-one correspondence between the vertices of two triangles such that two angles and the side opposite one of them in one triangle are congruent to the corresponding parts of the second triangle, then two triangles are congruent.

ASA triangle congruence *(G)* If there exists a one-to-one correspondence between the vertices of two triangles such that two angles and the included side of one triangle are congruent to the corresponding parts of the second triangle, then two triangles are congruent.

corresponding parts *(G)* In two geometric figures, the points, sides, and/or angles which are in the same relative position when the figures are placed in a one-to-one correspondence.

Example: In the one-to-one correspondence implied by $\Delta ABC \cong \Delta DEF$, point A corresponds to point D; side $\overline{AB}$ corresponds to side $\overline{DE}$; and $\angle ABC$ corresponds to $\angle DEF$, etc.

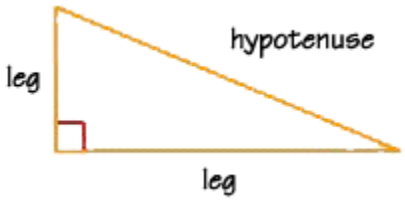


function *(A) (G) (A2T)* A rule that assigns to each number x in the function's domain a unique number $f(x)$.

equiangular *(G)* A polygon with all interior angles congruent.

hypotenuse *(A) (G)* The side of a right triangle opposite the right angle; the longest side of a right triangle.

Example:

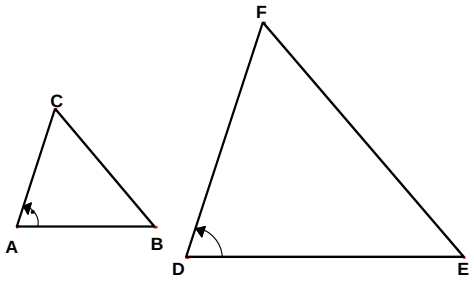


hypotenuse and leg triangle congruence *(G)* If there exists a one-to-one correspondence between the vertices of two right triangles such that the hypotenuse and leg of one right triangle are congruent to the hypotenuse and corresponding leg of the second right triangle, then the triangles are congruent.

SAS triangle congruence *(G)* If there exists a one-to-one correspondence between the vertices of two triangles, such that two sides and the included angle of one triangle are congruent to the corresponding two sides and included angle of the second triangle, then the two triangles are congruent.

SAS Similarity Theorem *(G)* If there exists a one-to-one correspondence between the vertices of two triangles, such that two pairs of corresponding sides are proportional and their included angles are congruent, then the two triangles are similar.

Example:

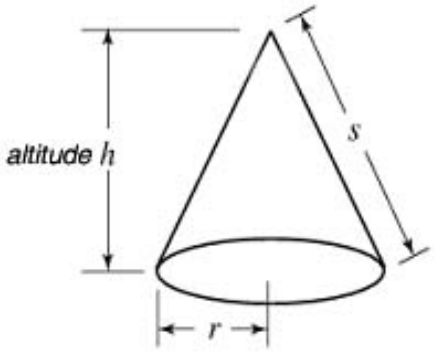


ΔABC is similar to ΔDEF because $\angle BAC \cong \angle EDF$ and $\frac{AC}{AB} = \frac{DF}{DE}$

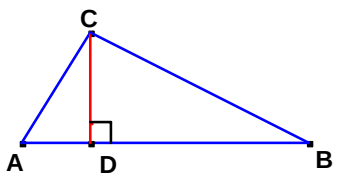
SSS triangle congruence *(G)* If there exists a one-to-one correspondence between the vertices of two triangles, such that all three sides of one triangle are congruent to the corresponding sides of the second triangle, then the two triangles are congruent.

Chapter 5

altitude *(G)* Of a *cone*: A line segment drawn from the vertex of the cone perpendicular to the plane containing its base.

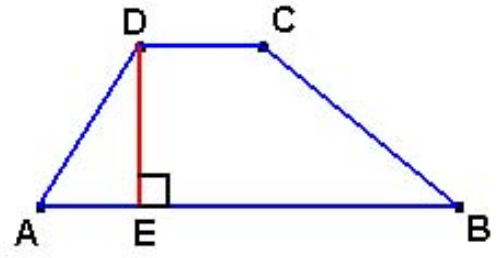


Of a triangle: A line segment drawn from any vertex of the triangle perpendicular to the line containing its opposite side.



altitude $\overline{CD}$

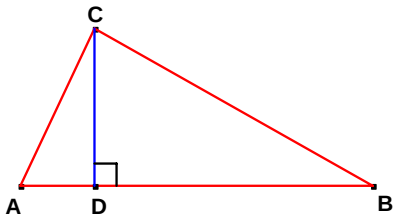
Of a trapezoid: A line segment drawn from any point on one base of the trapezoid perpendicular to the other base.



altitude $\overline{DE}$

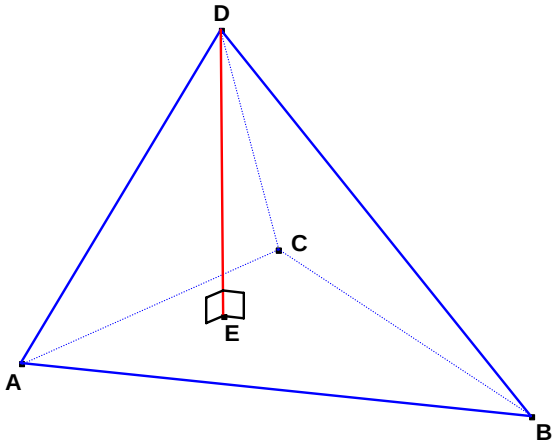
base *(G)* Any side or face of a geometric figure to which an altitude is drawn.

Examples: For ΔABC: $\overline{CD}$ is an altitude,
and $\overline{AB}$ is a base



altitude $\overline{CD}$

For pyramid $ABCD$: $\overline{DE}$ is an altitude,
and ΔABC is a base



centroid *(G)* The point of concurrency of the medians of a triangle; the center of gravity in a triangle.

circumcenter *(G)* The center of the circle circumscribed about a polygon; the point that is equidistant from the vertices of any polygon.

compound statement *(G)* A statement formed from two or more simple statements using the logic connectives, *or*, *and*, *if...then*, or *if and only if*.

concurrence *(G)* The concept of three or more lines intersecting in a single (common) point; having a single point of intersection.

Example: The medians of a triangle are concurrent.

contradiction *(G)* A statement that has been shown to be both true and false.

contrapositive of a statement *(G)* A statement formed by interchanging the hypothesis and conclusion of a conditional statement and negating each clause.

Example: $\sim q \rightarrow \sim p$ is the contrapositive of $p \rightarrow q$.

distance between a point and a line *(G)* The length of the perpendicular segment from the point to the line.

incenter of a triangle *(G)* The center of the circle that is inscribed in a triangle; the point of concurrence of the three angle bisectors of the triangle which is equidistant from the sides of the triangle.

indirect proof *(G)* A method of proof in which the statement that is to be proven is assumed false and a contradiction results.

inverse of a statement *(G)* A statement formed by negating both the hypothesis and conclusion of a given conditional.

Example: Given $p \rightarrow q$ the inverse is: $\sim p \rightarrow \sim q$

median of a triangle *(G)* A line segment that connects any vertex of a triangle to the midpoint of the opposite side.

midsegment *(G)* A line segment that connects the midpoints of two sides of a triangle; Also called the midline.

negation *(G)* For any given statement p, its negation is the statement , $\sim p$ (not p) whose truth value is the opposite of the truth value of p.

dodecahedron *(G)* A polyhedron that has twelve faces. A regular dodecahedron is one of the five Platonic solids and has twelve regular pentagons as faces.

Example:

orthocenter *(G)* The point of concurrence of the three altitudes of a triangle.

point of concurrency *(G)* A point that is the intersection of three or more lines.

triangle inequality theorem *(G)* In any triangle, the sum of the lengths of two sides is greater than the length of the third side.

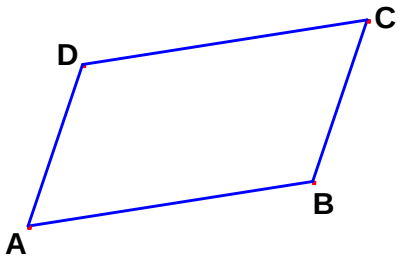
Chapter 6

coordinate geometry *(G)* An approach to geometry in which a point is represented by coordinates and algebraic methods of reasoning are used; also called analytical geometry.

isosceles trapezoid *(G)* A trapezoid in which the non-parallel sides are congruent.

parallelogram *(A) (G)* A quadrilateral in which both pairs of opposite sides are parallel.

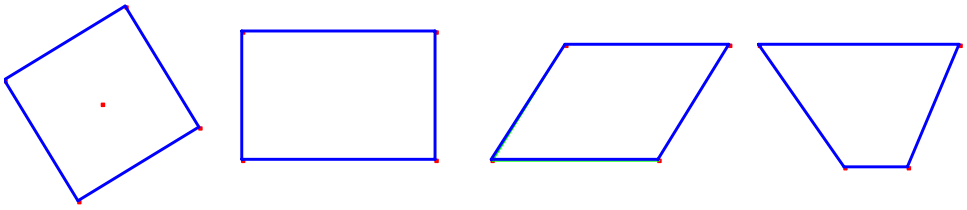
Example:



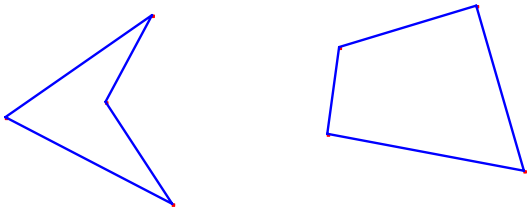
$\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{BC}$

quadrilateral *(A), (G)* A polygon with 4 sides.

Examples



square rectangle parallelogram trapezoid



concave quadrilateral quadrilateral

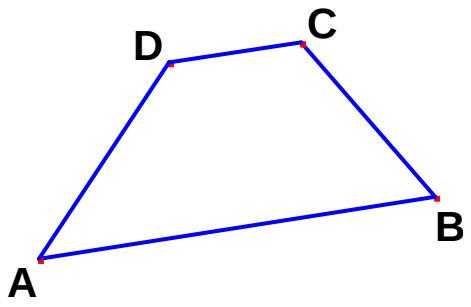
rectangle *(A) (G)* A parallelogram containing one right angle; a quadrilateral with four right angles.

rhombus *(A), (G)* A parallelogram with two adjacent congruent sides; a quadrilateral with four congruent sides**.**

square *(A) (G)* A rectangle with two congruent adjacent sides

trapezoid *(A)*, *(G)* A quadrilateral with exactly one pair of parallel sides.

Example: In the trapezoid below, $\overline{AB}$ ll $\overline{CD}$.

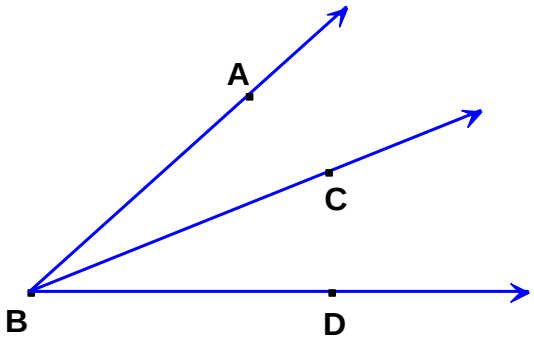


Chapter 7

AA triangle similarity *(G)* If there exists a one-to-one correspondence between the vertices of two triangles such that two angles of one triangle are congruent to the corresponding two angles of the second triangle, then the two triangles are similar.

angle addition postulate *(G)* If $\angle ABC$ and $\angle CBD$ are adjacent angles then $\angle ABD = \angle ABC + \angle CBD$.

Example:



$$\angle ABD = \angle ABC + \angle CBD$$

geometric mean *(G)* The geometric mean, also called the mean proportional, of two numbers a and b is the square root of their product. If $\frac{a}{m} = \frac{m}{b}$ then m is the geometric mean of a and b.

golden ratio *(G)* When a line segment $\overline{AB}$ is divided by an interior point P such that $\frac{AB}{AP} = \frac{AP}{PB}$, the ratio $\frac{AB}{AP} = \frac{1}{2}\left(1+\sqrt{5}\right)$ is called the golden ratio.

golden rectangle *(G)* A rectangle whose adjacent sides have a ratio equal to the golden ratio.

proportional *(A) (G)* Two variables are proportional if they maintain a constant ratio. See also direct variation.

Examples:

If cans of soup cost 75 cents each, the cost of any quantity of cans is proportional to the quantity of cans because the ratio of the total cost to the quantity of cans is always 75 cents:1 can.

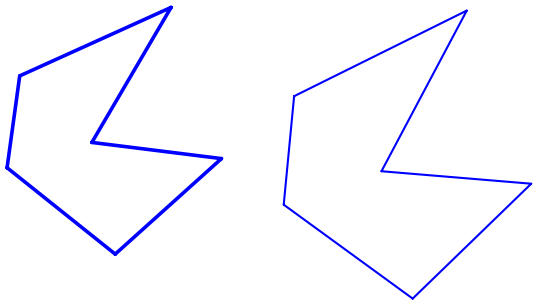
The perimeter of any square is proportional to the length of one of its sides because the ratio of the length of one side to the perimeter is always 1:4.

quadratic equation *(A), (G),(A2T)* An equation that can be written in the form $ax^2 + bx + c = 0$, where *a, b*, and *c* are real constants and $a \neq 0$.

radical *(A,G,A2T)* The root of a quantity as indicated by the radical sign.

similar polygons *(G)* Two polygons which have the same shape but not necessarily the same size.

Example:



Chapter 8

identity elements *(A) (G)* For a binary operation * and a set S, I is the identity element if *a* * I = *a* and I * *a* = *a* for every element *a* that is in S.

Examples: (1) For addition (+) and the set of Integers, the number 0 is the identity element, because for every integer *a*: 0 + *a* = *a* and *a* + 0 = *a*.
(2) For multiplication (x) and the set of Real Numbers, the number 1 is the identity element, because for every Real Number *a:* 1 x *a* = *a* and *a* x 1 = *a*.

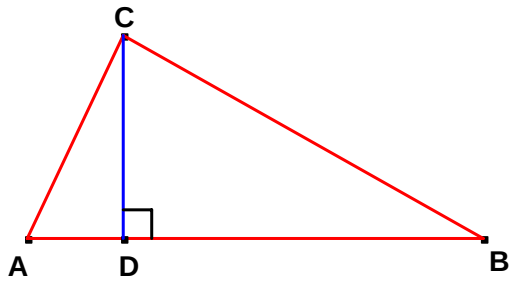
Pythagorean theorem *(A) (G)* The mathematical relationship stating that in any right triangle the sum of the squares of the lengths of the two legs is equal to the square of the length of the hypotenuse; if *a* and *b* are the lengths of the legs and *c* is the length of the hypotenuse, then $a^2 + b^2 = c^2$.

vector *(G) (A2T),* A quantity that has both magnitude and direction; represented geometrically by a directed line segment.

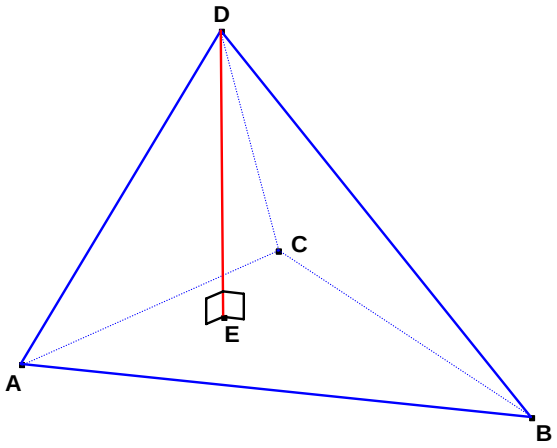
Chapter 9

base *(G)* Any side or face of a geometric figure to which an altitude is drawn.

Examples: For ΔABC: $\overline{CD}$ is an altitude,
and $\overline{AB}$ is a base



For pyramid $ABCD$: $\overline{DE}$ is an altitude,
and ΔABC is a base

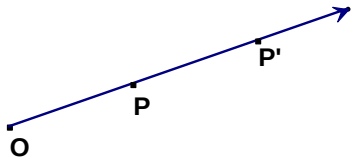


center of a dilation *(G)* A fixed point in the plane about which all points are expanded or contracted; the only invariant point under dilation.

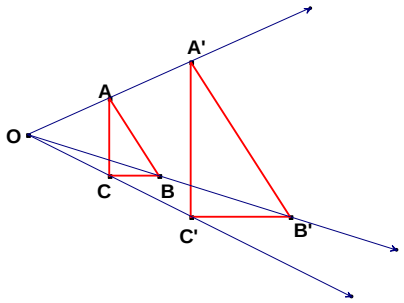
center of a rotation *(G)* A fixed point in the plane about which all points are rotated.

dilation *(G)* A transformation of the plane such that if O is a fixed point, k is a non-zero real number, and P' is the image of point P, then O, P and P' are collinear and $\frac{OP'}{OP} = k$.

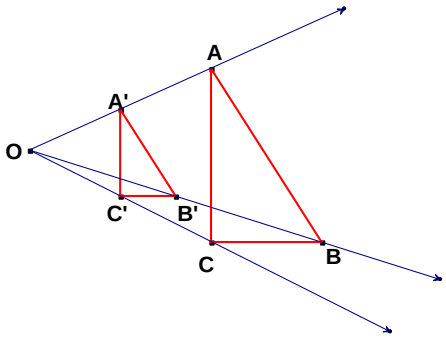
Examples:



P' is the image P under a dilation about O of ratio 2;
$OP' = 2OP$



$\Delta A'B'C'$ is the image of ΔABC under a dilation about O of ratio 2;
$OA' = 2OA$, $OB' = 2OB$, and $OC' = 2OC$



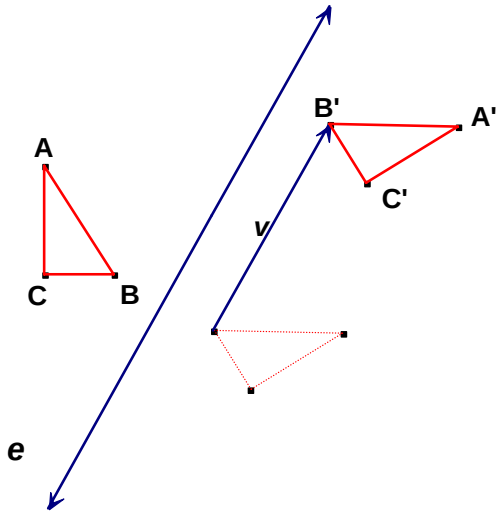
$\Delta A'B'C'$ is the image of ΔABC under a dilation about O of ratio ½;
$OA' = \frac{1}{2}OA$, $OB' = \frac{1}{2}OB$, and $OC' = \frac{1}{2}OC$.

direct transformation *(G)* Any transformation of the plane that preserves orientation.

Examples: A translation, rotation or a dilation.

glide reflection *(G)* A transformation that is the composition of a line reflection and a translation through a vector parallel to that line of reflection.

Example:



$\Delta A'B'C'$ is the image of ΔABC under a glide reflection that is the composition of a reflection over line *l* and a translation through vector *v.*

image *(A), (G), (A2T)* The resulting point or set of points under a given transformation; in any function f, the image of x is the functional value $f(x)$ corresponding to x.

Examples: In transformational geometry if $R_{P,90}(A) = A'$, then point A' is the image of point A under the rotation, $R_{P,90}$.

In the function $f(x) = x^2 + 3$, 7 is the image of 2 under f.

intersecting lines *(G)* Lines that share a common point.

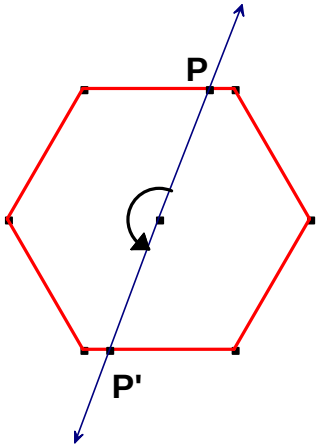
isometry (G) A transformation of the plane that preserves distance.

If P' is the image of P, and Q' is the image of Q, then the distance from P' to Q' is the same as the distance from P to Q.

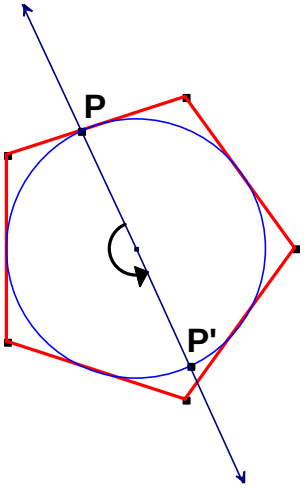
line symmetry *(G)* A geometric figure has line symmetry if the figure is the image of itself under a reflection in a line.

point symmetry *(G)* A geometric figure has point symmetry if every point on the figure is the image of itself under a rotation of 180° about some fixed point.

Examples:



A regular hexagon has point symmetry about its center.



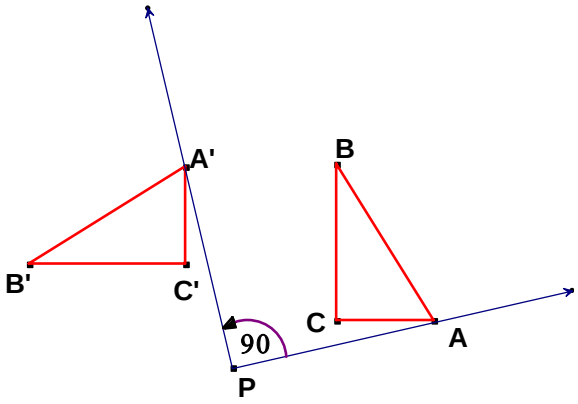
A pentagon does not have point symmetry

preimage *(G)* The original point or points of a transformation.

reflection *(G)* An isometry where if l is any line and P is any point not on l, then $r_l(P) = P'$ where l is the perpendicular bisector of $\overline{PP'}$ and if $P \in l$ then $r_l(P) = P$.

rotation *(G)* An isometry where if P is a fixed point in the plane, θ is any angle and $A \neq P$ then $R_{P,\theta}(A) = A'$ where $m\angle APA' = \theta$ and $R_{P,\theta}(P) = P$.

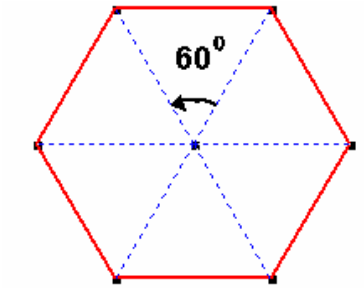
Example:



$$R_{P,\ 90^\circ}(\Delta ABC) = \Delta A'B'C'$$

rotational symmetry *(G)* A geometric figure has rotational symmetry if the figure is the image of itself under a rotation about a point through any angle whose measure is not a multiple of 360°.

Example:



A regular hexagon has rotational symmetry of $60^\circ,\ 120^\circ,\ 180^\circ,\ 240^\circ,$ and 300°

tessellation *(G)* A repeating pattern covering a plane.

Examples:

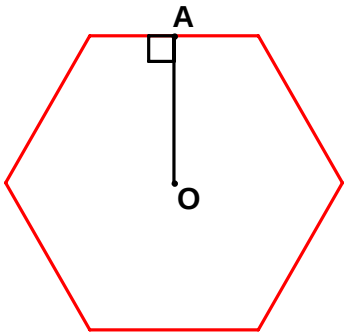
transformation *(G) (A2T)* A one-to-one mapping of points in the plane to points in the plane.

translation *(G)* A transformation where every point moves the same direction through the same distance.

Chapter 10

apothem *(G)* A line segment drawn from the center of a regular polygon perpendicular to a side of the polygon.

Example:



apothem $\overline{OA}$

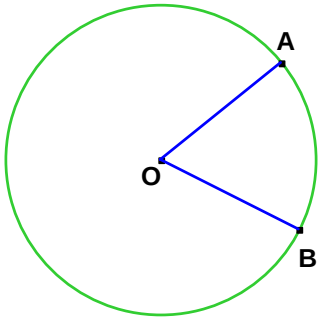
arc length *(G), (A2T)* The distance on the circumference of a circle from one endpoint of an arc to the other endpoint, measured along the arc.

arc measure *(G)* The measure of an arc of the circle in degrees or radians; a unique real number between 0 degrees and 360 degrees or between zero and 2π radians.

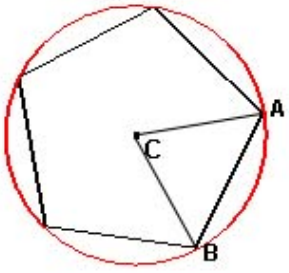
arc of a circle *(G)* See major arc, minor arc.

central angle *(A2T)* *(G)* An angle in a circle with vertex at the center of the circle and sides that are radii.

Example: Central angle *AOB*



central angle of a regular polygon *(G)* An angle in a regular polygon with vertex at the center of the polygon and sides that are radii of its circumcircle.



circle *(A) (G) (A2T)* The set of all points (or locus of points) in a plane that are a fixed distance, (called the radius) from a fixed point, (called the center).

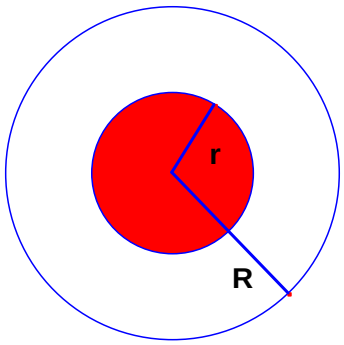
circumference *(G)* The length of or distance around a circle. The formula for circumference is: $C = 2\pi r = \pi d$

concentric circles *(G)* Two or more circles having the same center and different radii.

diameter *(G)* A chord of the circle that passes through the center of the circle.

geometric probability *(G)* A probability based on geometric relationships such as area, surface area or volume.

Example:

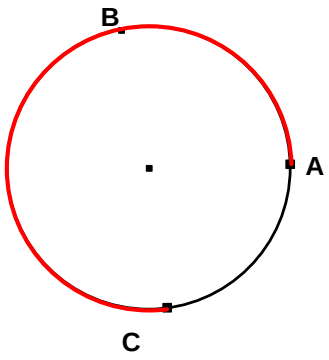


If an arrow hits the target, the probability of hitting the red (shaded) bulls eye is $\frac{\pi r^2}{\pi R^2}$

Heron's formula *(G)* The formula expressing the area of a triangle, A, in terms of its sides a, b, and c. $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{1}{2}(a+b+c)$ and is called the semi-perimeter.

major arc *(G)* In a circle, any arc whose length is greater than the length of a semicircle.

Example:

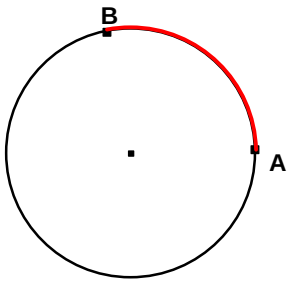


Major arc *ABC*

measure of an arc *(G)* The measure of the central angle that subtends the arc.

minor arc *(G)* In a circle, any arc whose length is less than the length of a semicircle.

Example:



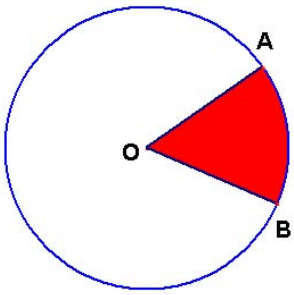
Minor arc *AC*

pi *(G)* (*A2T)* The irrational number equal to the length of the circumference of a circle divided by the length of its diameter.

radius *(G)* A line segment drawn from the center of a circle to a point on the circle.

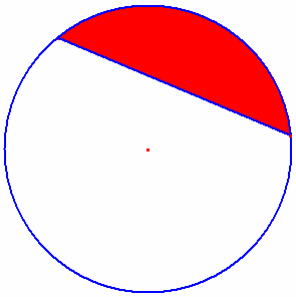
sector of a circle *(A) (G) (A2T)* A region bounded by an arc of the circle and the two radii to the endpoints of the arc.

Example: The shaded area in the circle below is a sector of circle *O*.



segment of a circle *(G)* The region bounded by a chord and the arc subtended by that chord.

Example: The shaded part of the circle is called a segment of a circle.

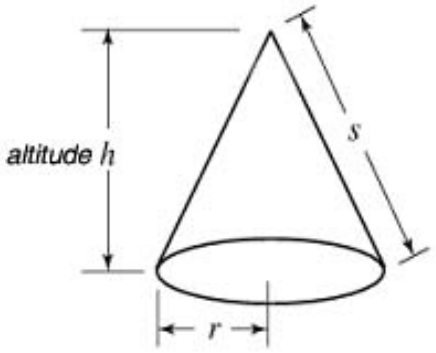


semi-circle *(A) (G)* Either of the arcs of a circle determined by the endpoints of a diameter.

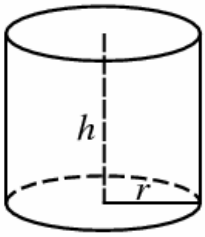
set *(A) (G)* A well-defined collection of items.

Chapter 11

altitude *(G)* Of a *cone*: A line segment drawn from the vertex of the cone perpendicular to the plane containing its base.

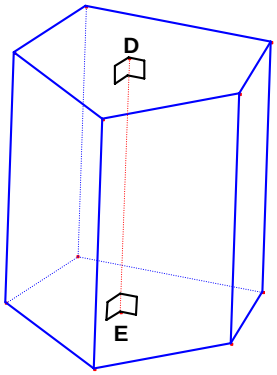


Of a cylinder: A line segment drawn from any point on one base of a cylinder perpendicular to the plane containing its other base.



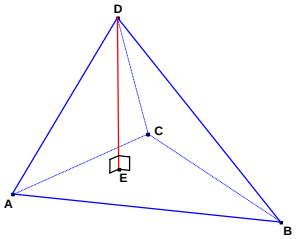
altitude h

Of a prism: A line segment drawn from any point of one base of the prism perpendicular to the plane containing its other base.



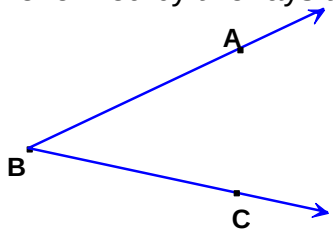
altitude $\overline{DE}$

Of a pyramid: A line segment drawn from the vertex of the pyramid perpendicular to the plane containing its base.



altitude $\overline{DE}$

angle *(A), (G), (A2T)* A geometric figure formed by two rays that have a common endpoint.

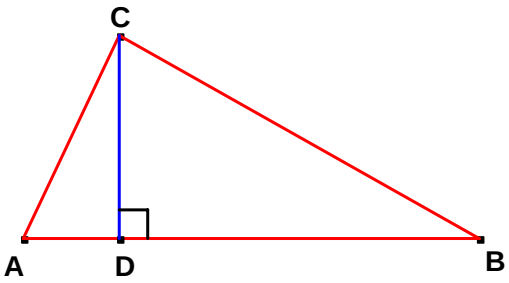


$\angle ABC$

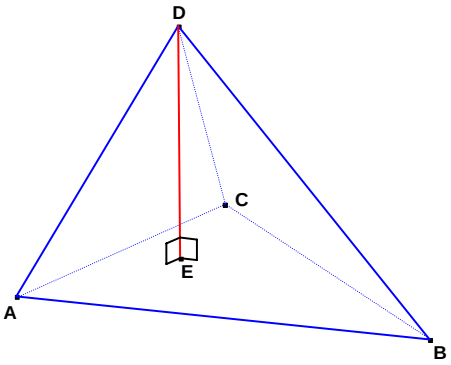
angle bisector *(G)* A ray that divides an angle into two adjacent congruent angles.

base *(G)* Any side or face of a geometric figure to which an altitude is drawn.

Examples: For ΔABC: $\overline{CD}$ is an altitude,
and $\overline{AB}$ is a base

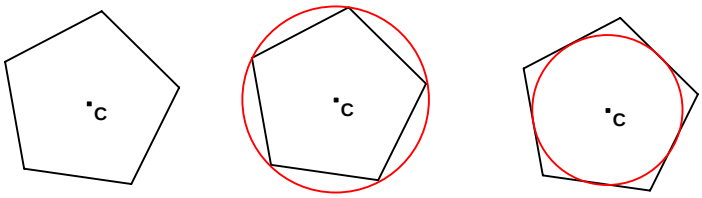


For pyramid $ABCD$: $\overline{DE}$ is an altitude,
and ΔABC is a base



center of a regular polygon *(G)* The center of the circle which circumscribes or inscribes a regular polygon.

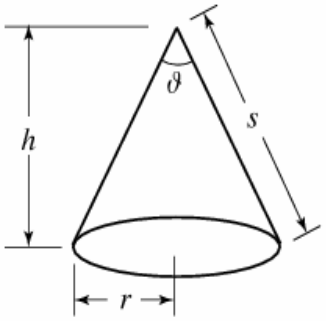
Examples:



circumscribes Inscribes

cone *(G)* A solid formed by a circular region (the base) and the surface formed by the straight line segments connecting points on the boundary of the base with a fixed point (the vertex) not in the plane of the base.

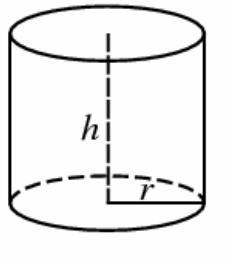
Example:



crossection *(G)* A plane section perpendicular to the longest axis of a solid.

cylinder (*A) (G)* A solid geometric figure bounded by two parallel bases which are congruent circles and a lateral surface which consists of the union of all line segments joining points on each of those circles.

Example:



diameter of a sphere *(G)* A line segment that connects two points on the surface of a sphere and that passes through the center of the sphere.

edge of a polyhedron *(G)* A line segment that connects two consecutive vertices of a polyhedron

face of a polyhedron *(G)* Any one of the polygons that bound a polyhedron.

great circle *(G)* The intersection of a sphere with any plane passing through the center of the sphere.

hemisphere *(G)* Half of a sphere bounded by a great circle.

lateral area of a prism *(G)* The sum of the areas of the faces of the prism not including the bases.

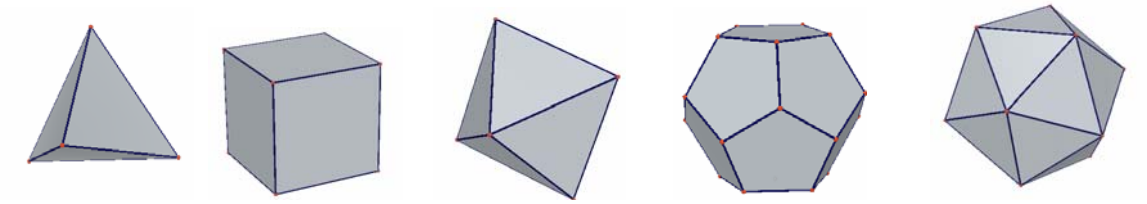
lateral face *(G)* A face of a polyhedron, not including its bases.

octahedron *(G)* A polyhedron having eight faces. A regular octahedron is one of the five Platonic solids and has eight equilateral triangles as faces.

Example:

Platonic solids *(G)* The five regular polyhedra: tetrahedron, cube, octahedron, dodecahedron and icosahedron.

Example:



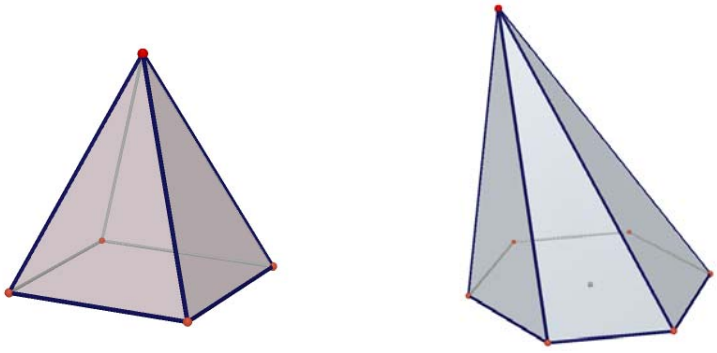
Tetrahedron Cube Octahedron Dodecahedron Icosahedron

polyhedron *(G)* A solid figure bounded by polygons.

prism *(G)* A polyhedron with two congruent, parallel, polygonal bases and whose lateral faces are parallelograms.

pyramid *(G)* A polyhedron having a polygonal base and triangles as lateral faces.

Example:



right square pyramid hexagonal pyramid

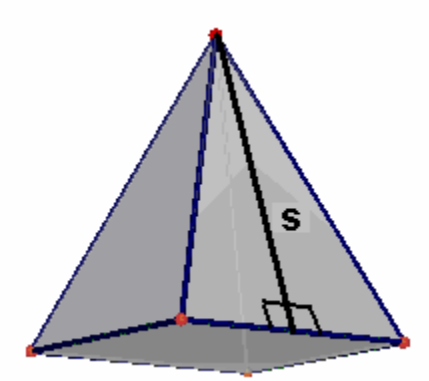
regular pyramid *(G)* A pyramid all of whose faces are equilateral triangles. Also called a tetrahedron.

right circular cylinder *(G)* A cylinder whose bases are circles and whose altitude passes through the center of both bases.

right circular cone *(G)* A cone whose base is a circle and whose altitude passes through the center of its base

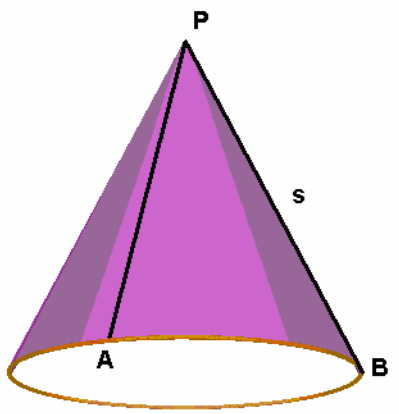
slant height *(G)* Of a *pyramid*: The altitude of a lateral face of a pyramid.

Examples:



S is the slant height of the pyramid.

Of a *cone*: The length of a line segment drawn on the lateral surface of a cone from its vertex to a point on the circle that determines its base



$PA = PB = s$ is the slant height of the cone

sphere *(G)* The locus of points in space at a given distance from a fixed point.

surface area *(A) (G)* The sum of the areas of all the faces or curved surfaces of a solid figure.

vertex of an angle *(A) (G)* The point of intersection of the two rays that form the sides of the angle.

vertex of a polygon *(A) (G)* A point where the edges of a polygon intersect.

vertex of a cone or pyramid *(G)* The fixed point, not in the plane of the base, to which all points on the perimeter of the base are connected.

volume *(A) (G)* A measure of the number of cubic units needed to fill the space inside a solid figure.

Chapter 12

center-radius equation of a circle *(A) (G) (A2T)* The form of the equation of a circle with center (*h, k*) and radius *r* given by the formula $(x-h)^2+(y-k)^2=r^2$.

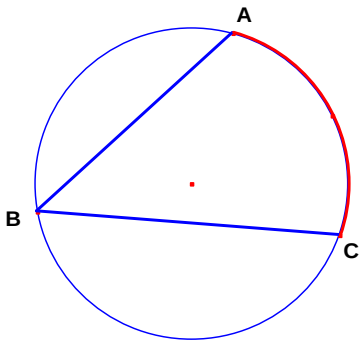
Example: If the coordinates of the center of the circle are $(3,-4)$ and the length of the radius is 5, then the equation of the circle is $(x-3)^2+(y+4)^2=5^2$.

chord *(G)* A line segment joining any two points on a circle. The diameter is the largest chord of a circle.

inscribed angle *(G)* An angle whose vertex lies on the circle and whose sides are chords of a circle.

intercepted arc *(G)* An arc of a circle whose endpoints lie on the sides of an angle, and all of the points on the arc are in the interior of the angle.

Example:



$\angle ABC$ intercepts arc AC

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locus of points *(G)* The set of all points satisfying a given condition or conditions.

Example: The locus of points that are equidistant from the endpoints of a line segment is the perpendicular bisector of that line segment.

point of tangency *(G)* The point where a tangent line intersects a curve.

secant (of a circle) *(G)* A line that intersects a circle in exactly two points.

tangent line to a circle *(G)* A line that intersects a circle in exactly one point.

P. 757 **absolute value** *(A), (G), (A2T)* The distance from 0 to a number *n* on a number line. The absolute value of a number *n* is indicated by $|n|$.

Example: $|-3| = 3$, $|+3| = 3$, and $|0| = 0$.

P. 702 **compound locus:** *(G)* A set of points satisfying two or more locus conditions.

P. 154-155 **Euclidean Geometry** *(G)* The study of geometry based on definitions undefined terms (point, line and plane) and the assumptions of Euclid (c.a. 330 B.C.)

P. 154-155 **Euclidean Parallel Postulate** *(G)* Any assumption equivalent to the following statement: If l is any line and P is any point not on l, then there exists exactly one line through P that is parallel to l.