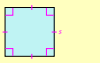
Tables

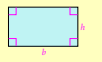
Table 1 Reading Math Symbols

. . .	and so on	p. 4	n-gon	polygon with n sides	p. 144
$=$	is equal to, equality	p. 4	m	slope of a linear function	p. 152
$\times, \cdot$	times (multiplication)	p. 4	b	y-intercept of a linear function	p. 152
n^2	square of n	p. 4	[ ]	brackets for grouping	p. 154
$+$	plus (addition)	p. 5	$\ncong$	is not congruent to	p. 200
$-a$	opposite of a	p. 6	$\triangleq$	triangles	p. 220
$\overline{AB}$	segment with endpoints A and B	p. 7	$\sim$	not	p. 265
$\overrightarrow{AB}$	ray with endpoint A and through point B	p. 7	$\geq$	is greater than or equal to	p. 272
$^\circ$	degree(s)	p. 7	$\leq$	is less than or equal to	p. 272
( )	parentheses for grouping	p. 8	$\ngtr$	is not greater than	p. 275
$-$	minus (subtraction)	p. 10	$\nless$	is not less than	p. 275
$\overleftrightarrow{AB}$	line through points A and B	p. 11	$\square ABCD$	parallelogram with vertices A, B, C, and D	p. 294
$\parallel$	is parallel to	p. 18	$\square\!\square$	parallelograms	p. 294
AB	length of $\overline{AB}$	p. 25	$\sqrt{x}$	nonnegative square root of x	p. 355
$\lvert a \rvert$	absolute value of a	p. 25	$\stackrel{?}{=}$	Is this statement true?	p. 359
$\cong$	is congruent to	p. 25	b_1, b_2	bases of a trapezoid	p. 374
$\angle A$	angle with vertex A	p. 27	d_1, d_2	lengths of diagonals	p. 375
$\angle ABC$	angle with sides $\overrightarrow{BA}$ and $\overrightarrow{BC}$	p. 27	a	apothem	p. 381
$m\angle A$	measure of angle A	p. 27	$\odot A$	circle with center A	p. 386
$\neg$	right angle symbol	p. 28	%	percent	p. 386
$\perp$	is perpendicular to	p. 35	$\overset{\frown}{AB}$	arc with endpoints A and B	p. 387
d	distance	p. 43	$\overset{\frown}{ABC}$	arc with endpoints A and C and containing B	p. 387
(a, b)	ordered pair with x-coordinate a and y-coordinate b	p. 43	$m\overset{\frown}{AB}$	measure of $\overset{\frown}{AB}$	p. 387
A	area	p. 52	P(event)	probability of the event	p. 402
s	length of a side	p. 52	$a:b, \frac{a}{b}$	ratio of a to b	p. 416
b	base length	p. 52	$\pm$	plus or minus	p. 422
h	height	p. 52	$\sim$	is similar to	p. 423
$\approx$	is approximately equal to	p. 52	A'	image of A, A prime	p. 432
d	diameter	p. 52	tan A	tangent of $\angle A$	p. 470
r	radius	p. 52	sin A	sine of $\angle A$	p. 477
P	perimeter	p. 52	cos A	cosine of $\angle A$	p. 477
π	pi, ratio of the circumference of a circle to its diameter	p. 52	$\overrightarrow{AB}$	vector with initial point A and terminal point B	p. 490
C	circumference	p. 52	$\langle x, y \rangle$	ordered pair notation for a vector	p. 490
{ }	set brackets	p. 68	$\mathbf{v}$	vector $\mathbf{v}$	p. 492
$\rightarrow$	maps to	p. 71	B	area of a base	p. 529
$>$	is greater than	p. 73	h	length of an altitude	p. 529
$<$	is less than	p. 73	L.A.	lateral area	p. 529
$\leftrightarrow$	if and only if	p. 76	S.A.	surface area	p. 529
$\neq$	is not equal to	p. 90	ℓ	slant height	p. 537
$\measuredangle$	angles	p. 121	V	volume	p. 544
$\triangle ABC$	triangle with vertices A, B, and C	p. 132	$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$	matrix	p. 640

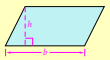
Table 2 Formulas



$P = 4s$
$A = s^2$
Square

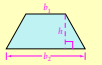


$P = 2b + 2h$
$A = bh$
Rectangle

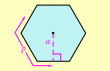


$A = bh$
Parallelogram

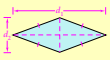
$A = \frac{1}{2}bh$
Triangle



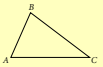
$A = \frac{1}{2}h(b_1 + b_2)$
Trapezoid



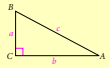
$A = \frac{1}{2}ap$
Regular Polygon



$A = \frac{1}{2}d_1d_2$
Rhombus

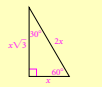


$m\angle A + m\angle B + m\angle C = 180$
Triangle Angle Sum

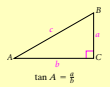


$a^2 + b^2 = c^2$
Pythagorean Theorem

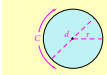
Ratio of sides $= 1:1:\sqrt{2}$
45°-45°-90° Triangle



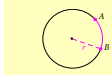
Ratio of sides $= 1:\sqrt{3}:2$
30°-60°-90° Triangle



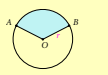
$\tan A = \frac{a}{b}$ $\cos A = \frac{b}{c}$
$\sin A = \frac{a}{c}$
Trigonometric Ratios



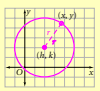
$C = \pi d$ or $C = 2\pi r$
$A = \pi r^2$
Circle



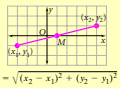
Length of $\overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360} \cdot 2\pi r$
Arc



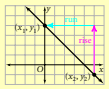
Area of sector $AOB = \frac{m\overset{\frown}{AB}}{360} \cdot \pi r^2$
Sector of a Circle



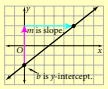
$r^2 = (x - h)^2 + (y - k)^2$
Equation of Circle



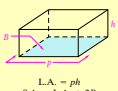
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
Distance and Midpoint



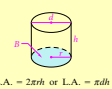
$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$
Slope



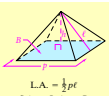
$y = mx + b$
Slope-intercept Form of a Linear Equation



L.A. $= ph$
S.A. $=$ L.A. $+ 2B$
$V = Bh$
Right Prism

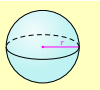


L.A. $= 2\pi rh$ or L.A. $= \pi dh$
S.A. $=$ L.A. $+ 2B$
$V = Bh$ or $V = \pi r^2 h$
Right Cylinder



L.A. $= \frac{1}{2}p\ell$
S.A. $=$ L.A. $+ B$
$V = \frac{1}{3}Bh$
Regular Pyramid

L.A. $= \pi r\ell$
S.A. $=$ L.A. $+ B$
$V = \frac{1}{3}Bh$ or $V = \frac{1}{3}\pi r^2 h$
Right Cone



S.A. $= 4\pi r^2$
$V = \frac{4}{3}\pi r^3$
Sphere

Table 3 Measures

United States Customary	Metric
Length	
12 inches (in.) = 1 foot (ft) 36 in. = 1 yard (yd) 3 ft = 1 yard 5280 ft = 1 mile (mi) 1760 yd = 1 mile	10 millimeters (mm) = 1 centimeter (cm) 100 cm = 1 meter (m) 1000 mm = 1 meter 1000 m = 1 kilometer (km)
Area	
144 square inches (in.^{2}) = 1 square foot (ft^2) 9 ft^2 = 1 square yard (yd^2) 43,560 ft^2 = 1 acre 4840 yd^2 = 1 acre	100 square millimeters (mm^2) = 1 square centimeter (cm^2) 10,000 cm^2 = 1 square meter (m^2) 10,000 m^2 = 1 hectare (ha)
Volume	
1728 cubic inches (in.^{3}) = 1 cubic foot (ft^3) 27 ft^3 = 1 cubic yard (yd^3)	1000 cubic millimeters (mm^3) = 1 cubic centimeter (cm^3) 1,000,000 cm^3 = 1 cubic meter (m^3)
Liquid Capacity	
8 fluid ounces (fl oz) = 1 cup (c) 2 c = 1 pint (pt) 2 pt = 1 quart (qt) 4 qt = 1 gallon (gal)	1000 milliliters (mL) = 1 liter (L) 1000 L = 1 kiloliter (kL)
Weight or Mass	
16 ounces (oz) = 1 pound (lb) 2000 pounds = 1 ton (t)	1000 milligrams (mg) = 1 gram (g) 1000 g = 1 kilogram (kg) 1000 kg = 1 metric ton
Temperature	
32°F = freezing point of water 98.6°F = normal body temperature 212°F = boiling point of water	0°C = freezing point of water 37°C = normal body temperature 100°C = boiling point of water
Time	
60 seconds (s) = 1 minute (min) 60 minutes = 1 hour (h) 24 hours = 1 day (d) 7 days = 1 week (wk) 4 weeks (approx.) = 1 month (mo)	365 days = 1 year (yr) 52 weeks (approx.) = 1 year 12 months = 1 year 10 years = 1 decade 100 years = 1 century

Table 4 Properties of Real Numbers

Unless otherwise stated, a, b, c, and d are real numbers.

Identity Properties

Addition $a + 0 = a$ and $0 + a = a$

Multiplication $a \cdot 1 = a$ and $1 \cdot a = a$

Commutative Properties

Addition $a + b = b + a$

Multiplication $a \cdot b = b \cdot a$

Associative Properties

Addition $(a + b) + c = a + (b + c)$

Multiplication $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Inverse Properties

Addition

The sum of a number and its *opposite*, or *additive inverse*, is zero.

$a + (-a) = 0$ and $-a + a = 0$

Multiplication

The reciprocal, or multiplicative inverse, of a rational number $\frac{a}{b}$ is $\frac{b}{a}$ $(a, b \neq 0)$.

$a \cdot \frac{1}{a} = 1$ and $\frac{1}{a} \cdot a = 1$ $(a \neq 0)$

Distributive Properties

$a(b + c) = ab + ac$ $\quad (b + c)a = ba + ca$

$a(b - c) = ab - ac$ $\quad (b - c)a = ba - ca$

Properties of Equality

Addition If $a = b$, then $a + c = b + c$.

Subtraction If $a = b$, then $a - c = b - c$.

Multiplication If $a = b$, then $a \cdot c = b \cdot c$.

Division If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

Substitution If $a = b$, then b can replace a in any expression.

Reflexive $a = a$

Symmetric If $a = b$, then $b = a$.

Transitive If $a = b$ and $b = c$, then $a = c$.

Properties of Proportions

$\frac{a}{b} = \frac{c}{d}$ $(a, b, c, d \neq 0)$ is equivalent to

(1) $ad = bc$ (2) $\frac{b}{a} = \frac{d}{c}$

(3) $\frac{a}{c} = \frac{b}{d}$ (4) $\frac{a+b}{b} = \frac{c+d}{d}$

Zero-Product Property

If $ab = 0$, then $a = 0$ or $b = 0$.

Properties of Inequality

Addition If $a > b$ and $c \geq d$, then $a + c > b + d$.

Multiplication If $a > b$ and $c > 0$, then $ac > bc$. If $a > b$ and $c < 0$, then $ac < bc$.

Transitive If $a > b$ and $b > c$, then $a > c$.

Comparison If $a = b + c$ and $c > 0$, then $a > b$.

Properties of Exponents

For any nonzero numbers a and b, any positive number c, and any integers m and n,

Zero Exponent $a^0 = 1$

Negative Exponent $a^{-n} = \frac{1}{a^n}$

Product of Powers $a^m \cdot a^n = a^{m+n}$

Quotient of Powers $\frac{a^m}{a^n} = a^{m-n}$

Power to a Power $(c^m)^n = c^{mn}$

Product to a Power $(ab)^n = a^n b^n$

Quotient to a Power $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

Properties of Square Roots

For any nonnegative numbers a and b, and any positive number c,

Product of Square Roots $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$

Quotient of Square Roots $\frac{\sqrt{a}}{\sqrt{c}} = \sqrt{\frac{a}{c}}$

Table 5 Squares and Square Roots

Number n	Square n^2	Positive Square Root $\sqrt{n}$	Number n	Square n^2	Positive Square Root $\sqrt{n}$	Number n	Square n^2	Positive Square Root $\sqrt{n}$
1	1	1.000	51	2601	7.141	101	10,201	10.050
2	4	1.414	52	2704	7.211	102	10,404	10.100
3	9	1.732	53	2809	7.280	103	10,609	10.149
4	16	2.000	54	2916	7.348	104	10,816	10.198
5	25	2.236	55	3025	7.416	105	11,025	10.247
6	36	2.449	56	3136	7.483	106	11,236	10.296
7	49	2.646	57	3249	7.550	107	11,449	10.344
8	64	2.828	58	3364	7.616	108	11,664	10.392
9	81	3.000	59	3481	7.681	109	11,881	10.440
10	100	3.162	60	3600	7.746	110	12,100	10.488
11	121	3.317	61	3721	7.810	111	12,321	10.536
12	144	3.464	62	3844	7.874	112	12,544	10.583
13	169	3.606	63	3969	7.937	113	12,769	10.630
14	196	3.742	64	4096	8.000	114	12,996	10.677
15	225	3.873	65	4225	8.062	115	13,225	10.724
16	256	4.000	66	4356	8.124	116	13,456	10.770
17	289	4.123	67	4489	8.185	117	13,689	10.817
18	324	4.243	68	4624	8.246	118	13,924	10.863
19	361	4.359	69	4761	8.307	119	14,161	10.909
20	400	4.472	70	4900	8.367	120	14,400	10.954
21	441	4.583	71	5041	8.426	121	14,641	11.000
22	484	4.690	72	5184	8.485	122	14,884	11.045
23	529	4.796	73	5329	8.544	123	15,129	11.091
24	576	4.899	74	5476	8.602	124	15,376	11.136
25	625	5.000	75	5625	8.660	125	15,625	11.180
26	676	5.099	76	5776	8.718	126	15,876	11.225
27	729	5.196	77	5929	8.775	127	16,129	11.269
28	784	5.292	78	6084	8.832	128	16,384	11.314
29	841	5.385	79	6241	8.888	129	16,641	11.358
30	900	5.477	80	6400	8.944	130	16,900	11.402
31	961	5.568	81	6561	9.000	131	17,161	11.446
32	1024	5.657	82	6724	9.055	132	17,424	11.489
33	1089	5.745	83	6889	9.110	133	17,689	11.533
34	1156	5.831	84	7056	9.165	134	17,956	11.576
35	1225	5.916	85	7225	9.220	135	18,225	11.619
36	1296	6.000	86	7396	9.274	136	18,496	11.662
37	1369	6.083	87	7569	9.327	137	18,769	11.705
38	1444	6.164	88	7744	9.381	138	19,044	11.747
39	1521	6.245	89	7921	9.434	139	19,321	11.790
40	1600	6.325	90	8100	9.487	140	19,600	11.832
41	1681	6.403	91	8281	9.539	141	19,881	11.874
42	1764	6.481	92	8464	9.592	142	20,164	11.916
43	1849	6.557	93	8649	9.644	143	20,449	11.958
44	1936	6.633	94	8836	9.695	144	20,736	12.000
45	2025	6.708	95	9025	9.747	145	21,025	12.042
46	2116	6.782	96	9216	9.798	146	21,316	12.083
47	2209	6.856	97	9409	9.849	147	21,609	12.124
48	2304	6.928	98	9604	9.899	148	21,904	12.166
49	2401	7.000	99	9801	9.950	149	22,201	12.207
50	2500	7.071	100	10,000	10.000	150	22,500	12.247

Table 6 Trigonometric Ratios

Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent
1°	0.0175	0.9998	0.0175	46°	0.7193	0.6947	1.0355
2°	0.0349	0.9994	0.0349	47°	0.7314	0.6820	1.0724
3°	0.0523	0.9986	0.0524	48°	0.7431	0.6691	1.1106
4°	0.0698	0.9976	0.0699	49°	0.7547	0.6561	1.1504
5°	0.0872	0.9962	0.0875	50°	0.7660	0.6428	1.1918
6°	0.1045	0.9945	0.1051	51°	0.7771	0.6293	1.2349
7°	0.1219	0.9925	0.1228	52°	0.7880	0.6157	1.2799
8°	0.1392	0.9903	0.1405	53°	0.7986	0.6018	1.3270
9°	0.1564	0.9877	0.1584	54°	0.8090	0.5878	1.3764
10°	0.1736	0.9848	0.1763	55°	0.8192	0.5736	1.4281
11°	0.1908	0.9816	0.1944	56°	0.8290	0.5592	1.4826
12°	0.2079	0.9781	0.2126	57°	0.8387	0.5446	1.5399
13°	0.2250	0.9744	0.2309	58°	0.8480	0.5299	1.6003
14°	0.2419	0.9703	0.2493	59°	0.8572	0.5150	1.6643
15°	0.2588	0.9659	0.2679	60°	0.8660	0.5000	1.7321
16°	0.2756	0.9613	0.2867	61°	0.8746	0.4848	1.8040
17°	0.2924	0.9563	0.3057	62°	0.8829	0.4695	1.8807
18°	0.3090	0.9511	0.3249	63°	0.8910	0.4540	1.9626
19°	0.3256	0.9455	0.3443	64°	0.8988	0.4384	2.0503
20°	0.3420	0.9397	0.3640	65°	0.9063	0.4226	2.1445
21°	0.3584	0.9336	0.3839	66°	0.9135	0.4067	2.2460
22°	0.3746	0.9272	0.4040	67°	0.9205	0.3907	2.3559
23°	0.3907	0.9205	0.4245	68°	0.9272	0.3746	2.4751
24°	0.4067	0.9135	0.4452	69°	0.9336	0.3584	2.6051
25°	0.4226	0.9063	0.4663	70°	0.9397	0.3420	2.7475
26°	0.4384	0.8988	0.4877	71°	0.9455	0.3256	2.9042
27°	0.4540	0.8910	0.5095	72°	0.9511	0.3090	3.0777
28°	0.4695	0.8829	0.5317	73°	0.9563	0.2924	3.2709
29°	0.4848	0.8746	0.5543	74°	0.9613	0.2756	3.4874
30°	0.5000	0.8660	0.5774	75°	0.9659	0.2588	3.7321
31°	0.5150	0.8572	0.6009	76°	0.9703	0.2419	4.0108
32°	0.5299	0.8480	0.6249	77°	0.9744	0.2250	4.3315
33°	0.5446	0.8387	0.6494	78°	0.9781	0.2079	4.7046
34°	0.5592	0.8290	0.6745	79°	0.9816	0.1908	5.1446
35°	0.5736	0.8192	0.7002	80°	0.9848	0.1736	5.6713
36°	0.5878	0.8090	0.7265	81°	0.9877	0.1564	6.3138
37°	0.6018	0.7986	0.7536	82°	0.9903	0.1392	7.1154
38°	0.6157	0.7880	0.7813	83°	0.9925	0.1219	8.1443
39°	0.6293	0.7771	0.8098	84°	0.9945	0.1045	9.5144
40°	0.6428	0.7660	0.8391	85°	0.9962	0.0872	11.4301
41°	0.6561	0.7547	0.8693	86°	0.9976	0.0698	14.3007
42°	0.6691	0.7431	0.9004	87°	0.9986	0.0523	19.0811
43°	0.6820	0.7314	0.9325	88°	0.9994	0.0349	28.6363
44°	0.6947	0.7193	0.9657	89°	0.9998	0.0175	57.2900
45°	0.7071	0.7071	1.0000	90°	1.0000	0.0000	

Postulates, Theorems, and Constructions

Chapter 1: Tools of Geometry

Postulate 1-1
Through any two points there is exactly one line. (p. 12)

Postulate 1-2
If two lines intersect, then they intersect in exactly one point. (p. 12)

Postulate 1-3
If two planes intersect, then they intersect in exactly one line. (p. 12)

Postulate 1-4
Through any three noncollinear points there is exactly one plane. (p. 13)

Postulate 1-5
Ruler Postulate
The points of a line can be put into one-to-one correspondence with the real numbers so that the distance between any two points is the absolute value of the difference of the corresponding numbers. (p. 25)

Postulate 1-6
Segment Addition Postulate
If three points A, B, and C are collinear and B is between A and C, then $AB + BC = AC$. (p. 26)

Postulate 1-7
Protractor Postulate
Let $\overrightarrow{OA}$ and $\overrightarrow{OB}$ be opposite rays in a plane. $\overrightarrow{OA}$, $\overrightarrow{OB}$, and all the rays with endpoint O that can be drawn on one side of $\overrightarrow{AB}$ can be paired with the real numbers from 0 to 180 so that
a. $\overrightarrow{OA}$ is paired with 0 and $\overrightarrow{OB}$ is paired with 180.
b. If $\overrightarrow{OC}$ is paired with x and $\overrightarrow{OD}$ is paired with y, then $m\angle COD = |x - y|$. (p. 28)

Postulate 1-8
Angle Addition Postulate
If point B is in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$.
If $\angle AOC$ is a straight angle, then $m\angle AOB + m\angle BOC = 180$. (p. 28)

The Distance Formula
The distance d between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. (p. 43)
• Proof on p. 362, Exercise 46

The Midpoint Formula
The coordinates of the midpoint M of $\overline{AB}$ with endpoints $A(x_1, y_1)$ and $B(x_2, y_2)$ are the following.
$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ (p. 45)

The Distance Formula (Three Dimensions)
In a three-dimensional coordinate system, the distance between two points (x_1, y_1, z_1) and (x_2, y_2, z_2) can be found using this extension of the Distance Formula.
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$ (p. 48)

Postulate 1-9
If two figures are congruent, then their areas are equal. (p. 54)

Postulate 1-10
The area of a region is the sum of the areas of its nonoverlapping parts. (p. 54)

Chapter 2: Reasoning and Proof

Law of Detachment
If a conditional is true and its hypothesis is true, then its conclusion is true. In symbolic form: If $p \rightarrow q$ is a true statement and p is true, then q is true. (p. 83)

Law of Syllogism
If $p \rightarrow q$ and $q \rightarrow r$ are true statements, then $p \rightarrow r$ is a true statement. (p. 83)

Properties of Congruence
Reflexive Property
$\overline{AB} \cong \overline{AB}$ and $\angle A \cong \angle A$
Symmetric Property
If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.
If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
Transitive Property
If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.
If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$. (p. 91)

Theorem 2-1
Vertical Angles Theorem
Vertical angles are congruent. (p. 98)
• Proof on p. 98, Example 3

Theorem 2-2
Congruent Supplements Theorem
If two angles are supplements of the same angle (or of congruent angles), then the two angles are congruent. (p. 99)
• Proofs on p. 99; p. 102, Exercise 55

Theorem 2-3
Congruent Complements Theorem
If two angles are complements of the same angle (or of congruent angles), then the two angles are congruent. (p. 99)
• Proofs on p. 100, Exercise 19; p. 102, Exercise 56

Theorem 2-4
All right angles are congruent. (p. 99)
• Proof on p. 101, Exercise 31

Theorem 2-5
If two angles are congruent and supplementary, then each is a right angle. (p. 99)
• Proof on p. 101, Exercise 35

Chapter 3: Parallel and Perpendicular Lines

Postulate 3-1
Corresponding Angles Postulate
If a transversal intersects two parallel lines, then corresponding angles are congruent. (p. 116)

Theorem 3-1
Alternate Interior Angles Theorem
If a transversal intersects two parallel lines, then alternate interior angles are congruent. (p. 116)
• Proof on p. 117

Theorem 3-2
Same-Side Interior Angles Theorem
If a transversal intersects two parallel lines, then same-side interior angles are supplementary. (p. 116)
• Proof on p. 117, Example 3

Postulate 3-2
Converse of the Corresponding Angles Postulate
If two lines and a transversal form corresponding angles that are congruent, then the two lines are parallel. (p. 122)

Theorem 3-3
Converse of the Alternate Interior Angles Theorem
If two lines and a transversal form alternate interior angles that are congruent, then the two lines are parallel. (p. 123)
• Proof on p. 123, Example 1

Theorem 3-4
Converse of the Same-Side Interior Angles Theorem
If two lines and a transversal form same-side interior angles that are supplementary, then the two lines are parallel. (p. 123)
• Proofs on p. 126, Exercise 17 and p. 128, Exercise 47

Theorem 3-5
If two lines are parallel to the same line, then they are parallel to each other. (p. 124)
• Proof on p. 127, Exercise 26

Theorem 3-6
In a plane, if two lines are perpendicular to the same line, then they are parallel to each other. (p. 124)
• Proofs on p. 124, Example 3; p. 126, Exercise 16

Theorem 3-7
Triangle Angle-Sum Theorem
The sum of the measures of the angles of a triangle is 180. (p. 131)
• Proof on p. 132

Theorem 3-8
Triangle Exterior Angle Theorem
The measure of each exterior angle of a triangle equals the sum of the measures of its two remote interior angles. (p. 133)
• Proof on p. 137, Exercise 49
Corollary
The measure of an exterior angle of a triangle is greater than the measure of either of its remote interior angles. (p. 274)
• Proof on p. 274

Parallel Postulate
Through a point not on a line, there is one and only one line parallel to a given line. (p. 140)

Spherical Geometry Parallel Postulate
Through a point not on a line, there is no line parallel to the given line. (p. 140)

Theorem 3-9
Polygon Angle-Sum Theorem
The sum of the measures of the angles of an n-gon is $(n - 2)180$. (p. 145)
• Proof on p. 149, Exercise 54

Theorem 3-10
Polygon Exterior Angle-Sum Theorem
The sum of the measures of the exterior angles of a polygon, one at each vertex, is 360. (p. 146)
• Proofs on p. 142 (using a computer) and p. 148, Exercise 46

Slopes of Parallel Lines
If two nonvertical lines are parallel, their slopes are equal. If the slopes of two distinct nonvertical lines are equal, the lines are parallel. Any two vertical lines are parallel. (p. 158)
• Proofs on p. 437, Exercises 42, 43

Slopes of Perpendicular Lines
If two nonvertical lines are perpendicular, the product of their slopes is -1. If the slopes of two lines have a product of -1, the lines are perpendicular. Any horizontal line and vertical line are perpendicular. (p. 159)
• Proofs on p. 329, Exercise 34 and p. 337, Exercise 41

Chapter 4: Congruent Triangles

Theorem 4-1
If the two angles of one triangle are congruent to two angles of another triangle, then the third angles are congruent. (p. 181)
• Proof on p. 184, Exercise 45

Postulate 4-1
Side-Side-Side (SSS) Postulate
If the three sides of one triangle are congruent to the three sides of another triangle, then the two triangles are congruent. (p. 187)

Postulate 4-2
Side-Angle-Side (SAS) Postulate
If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent. (p. 188)

Postulate 4-3
Angle-Side-Angle (ASA) Postulate
If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent. (p. 195)

Theorem 4-2
Angle-Angle-Side (AAS) Theorem
If two angles and a nonincluded side of one triangle are congruent to two angles and the corresponding nonincluded side of another triangle, then the triangles are congruent. (p. 195)
• Proof on p. 196

Theorem 4-3
Isosceles Triangle Theorem
If two sides of a triangle are congruent, then the angles opposite those sides are congruent. (p. 211)
• Proofs on p. 211, Example 1; p. 213, Exercise 2
Corollary
If a triangle is equilateral, then the triangle is equiangular. (p. 212)
• Proof on p. 215, Exercise 32

Theorem 4-4
Converse of the Isosceles Triangle Theorem
If two angles of a triangle are congruent, then the sides opposite the angles are congruent. (p. 211)
• Proofs on p. 211, Question 1; p. 213, Exercise 1
Corollary
If a triangle is equiangular, then the triangle is equilateral. (p. 212)
• Proof on p. 215, Exercise 32

Theorem 4-5
The bisector of the vertex angle of an isosceles triangle is the perpendicular bisector of the base. (p. 211)
• Proof on p. 215, Exercise 41

Theorem 4-6
Hypotenuse-Leg (HL) Theorem
If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and a leg of another right triangle, then the triangles are congruent. (p. 217)
• Proof on p. 217

Chapter 5: Relationships Within Triangles

Theorem 5-1
Triangle Midsegment Theorem
If a segment joins the midpoints of two sides of a triangle, then the segment is parallel to the third side, and is half its length. (p. 244)
• Proof on p. 244

Theorem 5-2
Perpendicular Bisector Theorem
If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment. (p. 249)
• Proof on p. 253, Exercise 41

Theorem 5-3
Converse of the Perpendicular Bisector Theorem
If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment. (p. 249)
• Proof on p. 253, Exercise 42

Theorem 5-4
Angle Bisector Theorem
If a point is on the bisector of an angle, then the point is equidistant from the sides of the angle. (p. 250)
• Proof on p. 253, Exercise 48

Theorem 5-5
Converse of the Angle Bisector Theorem
If a point in the interior of an angle is equidistant from the sides of the angle, then the point is on the angle bisector. (p. 250)
• Proof on p. 254, Exercise 49

Theorem 5-6
The perpendicular bisectors of the sides of a triangle are concurrent at a point equidistant from the vertices. (p. 257)
• Proof on p. 261, Exercise 30

Theorem 5-7
The bisectors of the angles of a triangle are concurrent at a point equidistant from the sides. (p. 257)
• Proof on p. 261, Exercise 31

Theorem 5-8
The medians of a triangle are concurrent at a point that is two thirds the distance from each vertex to the midpoint of the opposite side. (p. 258)
• Proof on p. 336, Exercise 39

Theorem 5-9
The lines that contain the altitudes of a triangle are concurrent. (p. 259)
• Proof on p. 336, Exercise 40

Comparison Property of Inequality
If $a = b + c$ and $c > 0$, then $a > b$. (p. 273)
• Proof on p. 273

Theorem 5-10
If two sides of a triangle are not congruent, then the larger angle lies opposite the longer side. (p. 274)
• Proof on p. 278, Exercise 33

Theorem 5-11
If two angles of a triangle are not congruent, then the longer side lies opposite the larger angle. (p. 275)
• Proof on p. 275

Theorem 5-12
Triangle Inequality Theorem
The sum of the lengths of any two sides of a triangle is greater than the length of the third side. (p. 276)
• Proof on p. 278, Exercise 40

Chapter 6: Quadrilaterals

Theorem 6-1
Opposite sides of a parallelogram are congruent. (p. 294)
• Proofs on p. 294; p. 299, Exercise 36

Theorem 6-2
Opposite angles of a parallelogram are congruent. (p. 295)
• Proofs on p. 299, Exercises 37, 38

Theorem 6-3
The diagonals of a parallelogram bisect each other. (p. 296)
• Proofs on p. 296; p. 334, Exercise 2

Theorem 6-4
If three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal. (p. 297)
• Proof on p. 300, Exercise 55

Theorem 6-5
If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram. (p. 304)
• Proof on p. 304

Theorem 6-6
If one pair of opposite sides of a quadrilateral are both congruent and parallel, then the quadrilateral is a parallelogram. (p. 304)
• Proof on p. 307, Exercise 17

Theorem 6-7
If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram. (p. 305)
• Proof on p. 305

Theorem 6-8
If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram. (p. 305)
• Proof on p. 308, Exercise 19

Theorem 6-9
Each diagonal of a rhombus bisects two angles of the rhombus. (p. 312)
• Proof on p. 312

Theorem 6-10
The diagonals of a rhombus are perpendicular. (p. 313)
• Proof on p. 317, Exercise 54

Theorem 6-11
The diagonals of a rectangle are congruent. (p. 313)
• Proof on p. 313

Theorem 6-12
If one diagonal of a parallelogram bisects two angles of the parallelogram, then the parallelogram is a rhombus. (p. 314)
• Proof on p. 318, Exercise 61

Theorem 6-13
If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus. (p. 314)
• Proof on p. 318, Exercise 62

Theorem 6-14
If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle. (p. 314)
• Proof on p. 318, Exercise 63

Theorem 6-15
The base angles of an isosceles trapezoid are congruent. (p. 320)
• Proof on p. 324, Exercise 26

Theorem 6-16
The diagonals of an isosceles trapezoid are congruent. (p. 321)
• Proofs on p. 321; p. 334, Exercise 3

Theorem 6-17
The diagonals of a kite are perpendicular. (p. 322)
• Proof on p. 322

Theorem 6-18
(1) The midsegment of a trapezoid is parallel to the bases.
(2) The length of a midsegment of a trapezoid is half the sum of the lengths of the bases. (p. 332)
• Proof on p. 333, Question 1

Chapter 7: Area

Theorem 7-1
Area of a Rectangle
The area of a rectangle is the product of its base and height.
$A = bh$ (p. 349)

Theorem 7-2
Area of a Parallelogram
The area of a parallelogram is the product of a base and the corresponding height.
$A = bh$ (p. 349)

Theorem 7-3
Area of a Triangle
The area of a triangle is half the product of a base and the corresponding height.
$A = \frac{1}{2}bh$ (p. 350)

Theorem 7-4
Pythagorean Theorem
In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.
$a^2 + b^2 = c^2$ (p. 357)
• Proofs on p. 356; p. 363, Exercise 60; p. 379; p. 443, Exercise 38; p. 612, Exercise 36

Theorem 7-5
Converse of the Pythagorean Theorem
If the square of the length of one side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle. (p. 359)
• Proof on p. 364, Exercise 70

Theorem 7-6
If the square of the length of the longest side of a triangle is greater than the sum of the squares of the lengths of the other two sides, the triangle is obtuse. (p. 360)

Theorem 7-7
If the square of the length of the longest side of a triangle is less than the sum of the squares of the lengths of the other two sides, the triangle is acute. (p. 360)

Theorem 7-8
45°-45°-90° Triangle Theorem
In a 45°-45°-90° triangle, both legs are congruent and the length of the hypotenuse is $\sqrt{2}$ times the length of a leg.
longer leg $= \sqrt{2} \cdot$ leg (p. 366)
• Proof on p. 366

Theorem 7-9
30°-60°-90° Triangle Theorem
In a 30°-60°-90° triangle, the length of the hypotenuse is twice the length of the shorter leg. The length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.
hypotenuse $= 2 \cdot$ shorter leg
longer leg $= \sqrt{3} \cdot$ shorter leg (p. 367)
• Proof on p. 368

Theorem 7-10
Area of a Trapezoid
The area of a trapezoid is half the product of the height and the sum of the bases.
$A = \frac{1}{2}h(b_1 + b_2)$ (p. 374)

Theorem 7-11
Area of a Rhombus or a Kite
The area of a rhombus or a kite is half the product of the lengths of its diagonals.
$A = \frac{1}{2}d_1d_2$ (p. 375)
• Proof on p. 375

Theorem 7-12
Area of a Regular Polygon
The area of a regular polygon is half the product of the apothem and the perimeter.
$A = \frac{1}{2}ap$ (p. 381)

Postulate 7-1
Arc Addition Postulate
The measure of the arc formed by two adjacent arcs is the sum of the measures of the two arcs. (p. 387)

Theorem 7-13
Circumference of a Circle
The circumference of a circle is π times the diameter.
$C = \pi d$ or $C = 2\pi r$ (p. 388)

Theorem 7-14
Arc Length
The length of an arc of a circle is the product of the ratio $\frac{\text{measure of the arc}}{360}$ and the circumference of the circle.
length of $\overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360} \cdot 2\pi r$ (p. 389)

Theorem 7-15
Area of a Circle
The area of a circle is the product of π and the square of the radius.
$A = \pi r^2$ (p. 396)

Theorem 7-16
Area of a Sector of a Circle
The area of a sector of a circle is the product of the ratio $\frac{\text{measure of the arc}}{360}$ and the area of the circle.
Area of sector $AOB = \frac{m\overset{\frown}{AB}}{360} \cdot \pi r^2$ (p. 396)

Chapter 8: Similarity

Postulate 8-1
Angle-Angle Similarity (AA ~) Postulate
If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar. (p. 432)

Theorem 8-1
Side-Angle-Side Similarity (SAS ~) Theorem
If an angle of one triangle is congruent to an angle of a second triangle, and the sides including the two angles are proportional, then the triangles are similar. (p. 433)
• Proof on p. 433

Theorem 8-2
Side-Side-Side Similarity (SSS ~) Theorem
If the corresponding sides of two triangles are proportional, then the triangles are similar. (p. 433)
• Proof on p. 433

Theorem 8-3
The altitude to the hypotenuse of a right triangle divides the triangle into two triangles that are similar to the original triangle and to each other.(p. 440)
• Proof on p. 440
Corollary 1
The length of the altitude to the hypotenuse of a right triangle is the geometric mean of the lengths of the segments of the hypotenuse. (p. 440)
• Proof on p. 440
Corollary 2
The altitude to the hypotenuse of a right triangle separates the hypotenuse in such a way that the length of each leg of the triangle is the geometric mean of the length of the adjacent hypotenuse segment and the length of the hypotenuse. (p. 441)
• Proof on p. 441

Theorem 8-4
Side-Splitter Theorem
If a line is parallel to one side of a triangle and intersects the other two sides, then it divides those sides proportionally. (p. 446)
• Proof on p. 446
Corollary
If three parallel lines intersect two transversals, then the segments intercepted on the transversals are proportional. (p. 447)
• Proof on p. 450, Exercise 34
Converse
If a line divides two sides of a triangle proportionally, then it is parallel to the third side.
• Proof on p. 451, Exercise 47

Theorem 8-5
Triangle-Angle-Bisector Theorem
If a ray bisects an angle of a triangle, then it divides the opposite side into two segments that are proportional to the other two sides of the triangle. (p. 448)
• Proof on p. 448

Theorem 8-6
Perimeters and Areas of Similar Figures
If the similarity ratio of two similar figures is $\frac{a}{b}$, then
(1) the ratio of their perimeters is $\frac{a}{b}$ and
(2) the ratio of their areas is $\frac{a^2}{b^2}$. (p. 455)

Chapter 9: Right Triangle Trigonometry

Theorem 9-1
Area of a Triangle Given SAS
The area of a triangle is one half the product of the lengths of two sides and the sine of the included angle.
Area of $\triangle ABC = \frac{1}{2}bc(\sin A)$ (p. 500)
• Proof on p. 499

Chapter 10: Surface Area and Volume

Theorem 10-1
Lateral and Surface Areas of a Prism
The lateral area of a right prism is the product of the perimeter of the base and the height.
L.A. $= ph$
The surface area of a right prism is the sum of the lateral area and the areas of the two bases.
S.A. $=$ L.A. $+ 2B$ (p. 530)

Theorem 10-2
Lateral and Surface Areas of a Cylinder
The lateral area of a right cylinder is the product of the circumference of the base and the height of the cylinder.
L.A. $= 2\pi rh$, or L.A. $= \pi dh$
The surface area of a right cylinder is the sum of the lateral area and the areas of the two bases.
S.A. $=$ L.A. $+ 2B$, or S.A. $= 2\pi rh + 2\pi r^2$ (p. 530)

Theorem 10-3
Lateral and Surface Areas of a Regular Pyramid
The lateral area of a regular pyramid is half the product of the perimeter of the base and the slant height.
L.A. $= \frac{1}{2}p\ell$
The surface area of a regular pyramid is the sum of the lateral area and the area of the base.
S.A. $=$ L.A. $+ B$ (p. 538)

Theorem 10-4
Lateral and Surface Areas of a Cone
The lateral area of a right cone is half the product of the circumference of the base and the slant height.
L.A. $= \frac{1}{2} \cdot 2\pi r\ell$, or L.A. $= \pi r\ell$
The surface area of a right cone is the sum of the lateral area and the area of the base.
S.A. $=$ L.A. $+ B$ (p. 539)

Theorem 10-5
Cavalieri's Principle
If two space figures have the same height and the same cross-sectional area at every level, then they have the same volume. (p. 545)

Theorem 10-6
Volume of a Prism
The volume of a prism is the product of the area of a base and the height of the prism.
$V = Bh$ (p. 545)

Theorem 10-7
Volume of a Cylinder
The volume of a cylinder is the product of the area of the base and the height of the cylinder.
$V = Bh$, or $V = \pi r^2h$ (p. 546)

Theorem 10-8
Volume of a Pyramid
The volume of a pyramid is one third the product of the area of the base and the height of the pyramid.
$V = \frac{1}{3}Bh$ (p. 552)

Theorem 10-9
Volume of a Cone
The volume of a cone is one third the product of the area of the base and the height of the cone.
$V = \frac{1}{3}Bh$, or $V = \frac{1}{3}\pi r^2h$ (p. 553)

Theorem 10-10
Surface Area of a Sphere
The surface area of a sphere is four times the product of π and the square of the radius of the sphere.
S.A. $= 4\pi r^2$ (p. 558)

Theorem 10-11
Volume of a Sphere
The volume of a sphere is four thirds the product of π and the cube of the radius of the sphere.
$V = \frac{4}{3}\pi r^3$ (p. 560)

Theorem 10-12
Areas and Volumes of Similar Solids
If the similarity ratio of two similar solids is $a : b$, then
(1) the ratio of their corresponding areas is $a^2 : b^2$, and
(2) the ratio of their volumes is $a^3 : b^3$. (p. 567)

Chapter 11: Circles

Theorem 11-1
If a line is tangent to a circle, then the line is perpendicular to the radius drawn to the point of tangency. (p. 583)
• Proof on p. 583

Theorem 11-2
If a line in the plane of a circle is perpendicular to a radius at its endpoint on the circle, then the line is tangent to the circle. (p. 584)
• Proof on p. 588, Exercise 38

Theorem 11-3
The two segments tangent to a circle from a point outside the circle are congruent. (p. 585)
• Proof on p. 588, Exercise 40

Theorem 11-4
Within a circle or in congruent circles
(1) Congruent central angles have congruent chords.
(2) Congruent chords have congruent arcs.
(3) Congruent arcs have congruent central angles. (p. 590)
• Proofs on p. 594, Exercises 23, 24; p. 595, Exercise 35

Theorem 11-5
Within a circle or in congruent circles
(1) Chords equidistant from the center are congruent.
(2) Congruent chords are equidistant from the center. (p. 591)
• Proofs on p. 591; p. 595, Exercise 37

Theorem 11-6
In a circle, a diameter that is perpendicular to a chord bisects the chord and its arcs. (p. 592)
• Proof on p. 594, Exercise 25

Theorem 11-7
In a circle, a diameter that bisects a chord (that is not a diameter) is perpendicular to the chord. (p. 592)
• Proof on p. 592

Theorem 11-8
In a circle, the perpendicular bisector of a chord contains the center of the circle. (p. 592)
• Proof on p. 595, Exercise 36

Theorem 11-9
Inscribed Angle Theorem
The measure of an inscribed angle is half the measure of its intercepted arc. (p. 599)
• Proofs on p. 599; p. 603, Exercises 40, 41
Corollary 1
Two inscribed angles that intercept the same arc are congruent. (p. 600)
• Proof on p. 604, Exercise 42
Corollary 2
An angle inscribed in a semicircle is a right angle. (p. 600)
• Proof on p. 604, Exercise 43
Corollary 3
The opposite angles of a quadrilateral inscribed in a circle are supplementary. (p. 600)
• Proof on p. 604, Exercise 44

Theorem 11-10
The measure of an angle formed by a tangent and a chord is half the measure of the intercepted arc. (p. 600)
• Proof on p. 604, Exercise 45

Theorem 11-11
The measure of an angle formed by two lines that
(1) intersect inside a circle is half the sum of the measures of the intercepted arcs.
(2) intersect outside a circle is half the difference of the measures of the intercepted arcs. (p. 607)
• Proofs on p. 608; p. 612, Exercises 29, 30

Theorem 11-12
For a given point and circle, the product of the lengths of the two segments from the point to the circle is constant along any line through the point and circle. (p. 609)
• Proofs on p. 609; p. 612, Exercises 31–33

Theorem 11-13
An equation of a circle with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$. (p. 615)

Chapter 12: Transformations

Theorem 12-1
A translation or rotation is a composition of two reflections. (p. 654)

Theorem 12-2
A composition of reflections in two parallel lines is a translation. (p. 655)

Theorem 12-3
A composition of reflections in two intersecting lines is a rotation. (p. 655)

Theorem 12-4
Fundamental Theorem of Isometries
In a plane, one of two congruent figures can be mapped onto the other by a composition of at most three reflections. (p. 656)

Theorem 12-5
Isometry Classification Theorem
There are only four isometries. They are reflection, translation, rotation, and glide reflection. (p. 657)

Theorem 12-6
Every triangle tessellates. (p. 668)

Theorem 12-7
Every quadrilateral tessellates. (p. 668)

Constructions

Construction 1
Congruent Segments
Construct a segment congruent to a given segment. (p. 34)

Construction 2
Congruent Angles
Construct an angle congruent to a given angle. (p. 35)

Construction 3
Perpendicular Bisector
Construct the perpendicular bisector of a segment. (p. 36)

Construction 4
Angle Bisector
Construct the bisector of an angle. (p. 37)

Construction 5
Parallel Through a Point Not on a Line
Construct a line parallel to a given line and through a given point that is not on the line. (p. 165)

Construction 6
Perpendicular Through a Point on a Line
Construct the perpendicular to a given line at a given point on the line. (p. 166)

Construction 7
Perpendicular Through a Point Not on a Line
Construct the perpendicular to a given line through a given point not on the line. (p. 167)

English/Spanish Illustrated Glossary

A

Acute angle (p. 28) An acute angle is an angle whose measure is between 0 and 90.

Ángulo agudo (p. 28) Un ángulo agudo es un ángulo que mide entre 0 y 90 grados.

EXAMPLES

Acute triangle (p. 133) An acute triangle has three acute angles.

Triángulo acutángulo (p. 133) Un triángulo acutángulo tiene los tres ángulos agudos.

Adjacent angles (p. 96) Adjacent angles are two coplanar angles that have a common side and a common vertex but no common interior points.

Ángulos adyacentes (p. 96) Los ángulos adyacentes son dos ángulos coplanares que tienen un lado común y el mismo vértice, pero no tienen puntos interiores comunes.

∠1 and ∠2 are adjacent. ∠3 and ∠4 are *not* adjacent.

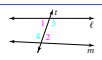
Adjacent arcs (p. 387) Adjacent arcs are on the same circle and have exactly one point in common.

Arcos adyacentes (p. 387) Los arcos adyacentes están en el mismo círculo y tienen exactamente un punto en común.

$\overset{\frown}{AB}$ and $\overset{\frown}{BC}$ are adjacent arcs.

Alternate interior angles (p. 115) Alternate interior angles are nonadjacent interior angles that lie on opposite sides of the transversal.

Ángulos alternos internos (p. 115) Dadas dos rectas y una transversal, los ángulos alternos internos son ángulos internos no adyacentes situados en lados opuestos de la transversal.



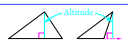
∠1 and ∠2 are alternate interior angles, as are ∠3 and ∠4.

Altitude *See* **cone; cylinder; parallelogram; prism; pyramid; trapezoid; triangle.**

Altura *Ver* **cone; cylinder; parallelogram; prism; pyramid; trapezoid; triangle.**

Altitude of a triangle (p. 259) An altitude of a triangle is a perpendicular segment from a vertex to the line containing the side opposite that vertex.

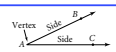
Altura de un triángulo (p. 259) Una altura de un triángulo es el segmento perpendicular que va desde un vértice hasta la recta que contiene el lado opuesto a ese vértice.



EXAMPLES

Angle (p. 27) An angle is formed by two rays with the same endpoint. The rays are the *sides* of the angle and the common endpoint is the *vertex* of the angle.

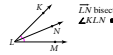
Ángulo (p. 27) Un ángulo está formado por dos rayos que convergen en un mismo punto llamado *vértice*. Los rayos son los *lados* del ángulo.



This angle could be named ∠*A*, ∠*BAC*, or ∠*CAB*.

Angle bisector (p. 36) An angle bisector is a ray that divides an angle into two congruent angles.

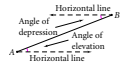
Bisectriz de un ángulo (p. 36) La bisectriz de un ángulo es un rayo que divide al ángulo en dos ángulos congruentes.



$\overline{LN}$ bisects ∠*KLM*.
∠*KLN* ≅ ∠*NLM*.

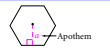
Angle of elevation or depression (p. 482) An angle of elevation (depression) is the angle formed by a horizontal line and the line of sight to an object above (below) the horizontal line.

Ángulo de elevación o depresión (p. 482) Un ángulo de elevación (depresión) es el ángulo formado por una línea horizontal y la recta que va de esa línea a un objeto situado arriba (debajo) de ella.



Apothem (p. 380) The apothem of a regular polygon is the distance from the center to a side.

Apotema (p. 380) La apotema de un polígono regular es la distancia desde el centro hasta un lado.



Arc *See* **major arc; minor arc.** *See also* **arc length; measure of an arc; semicircle.**

Arco *Ver* **major arc; minor arc.** *Ver también* **arc length; measure of an arc; semicircle.**

Arc length (p. 389) The length of an arc of a circle is the product of the ratio $\frac{\text{measure of the arc}}{360}$ and the circumference of the circle.

Longitud de un arco (p. 389) La longitud del arco de un círculo es el producto del cociente $\frac{\text{medida del arco}}{360}$ por la circunferencia del círculo.

Length of $\overset{\frown}{DE} = \frac{60}{360} \cdot 2\pi(5) = \frac{5\pi}{3}$

Area (pp. 348–351, 373–375, 381, 396, 401) The area of a plane figure is the number of square units enclosed by the figure. A list of area formulas is on pp. 726–727.

Área (pp. 348–351, 373–375, 381, 396, 401) El área de una figura plana es de unidades cuadradas que contiene la figura. Una lista de fórmulas para calcular áreas está en las págs. 726–727.

The area of the rectangle is 12 square units, or 12 units^2.

EXAMPLES

Axes (p. 43) *See* **coordinate plane.**

Ejes (p. 43) *Ver* **coordinate plane.**

Axiom (p. 12) *See* **postulate.**

Axioma (p. 12) *Ver* **postulate.**

B

Base(s) *See* **cone; cylinder; isosceles triangle; parallelogram; prism; pyramid; trapezium; triangle.**

Base(s) *Ver* **cone; cylinder; isosceles triangle; parallelogram; prism; pyramid; trapezium; triangle.**

Base angles *See* **isosceles trapezoid; isosceles triangle.**

Ángulos de base *Ver* **isosceles trapezoid; isosceles triangle.**

Biconditional (p. 75) A biconditional statement is the combination of a conditional statement and its converse. A biconditional contains the words "if and only if."

Bicondicional (p. 75) Un enunciado bicondicional es la combinación de un enunciado condicional y su recíproco. El enunciado bicondicional incluye las palabras "si y solo si".

This biconditional statement is true: Two angles are congruent *if and only if* they have the same measure.

Bisector *See* **segment bisector; angle bisector.**

Bisectriz *Ver* **segment bisector; angle bisector.**

C

Center *See* **circle; dilation; regular polygon; sphere.**

Centro *Ver* **circle; dilation; regular polygon; sphere.**

Central angle of a circle (p. 386) A central angle of a circle is an angle whose vertex is the center of the circle.

Ángulo central de un círculo (p. 386) Un ángulo central de un círculo es un ángulo cuyo vértice es el centro del círculo.

∠*ROK* is a central angle of ⊙*O*.

EXAMPLES

Central angle of a regular polygon (p. 498) A central angle of a regular polygon is an angle formed by two consecutive radii.

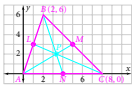
Ángulo central de un polígono regular (p. 498) Un ángulo central de un polígono regular es el ángulo formado por dos radios consecutivos.

∠*EFG* is a central angle of the regular pentagon.

Centroid (p. 258) The centroid of a triangle is the point of intersection of the medians of that triangle.

EXAMPLE *P* is the centroid of △*ABC*.

Centroide (p. 258) El centroide de un triángulo es el punto de intersección de las medianas del triángulo.



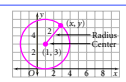
Chord (p. 590) A chord of a circle is a segment whose endpoints are on the circle.

Cuerda (p. 590) Una cuerda de un círculo es un segmento cuyos extremos son dos puntos del círculo.

$\overline{HD}$ and $\overline{HR}$ are chords of ⊙*C*.

Circle (pp. 386, 615) A circle is the set of all points in a plane that are a given distance, the *radius*, from a given point, the *center*. The standard form for an equation of a circle with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$.

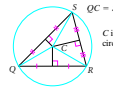
Círculo (pp. 386, 615) Un círculo es el conjunto de todos los puntos de un plano situados a una distancia dada, el *radio*, de un punto dado, el *centro*. La fórmula normal de la ecuación de un círculo con centro (h, k) y radio r es $(x - h)^2 + (y - k)^2 = r^2$.



The equation of the circle whose center is (1, 3) and whose radius is 2 is $(x - 1)^2 + (y - 3)^2 = 4$.

Circumcenter (p. 257) A circumcenter is the point of concurrency of the perpendicular bisectors of a triangle.

Circuncentro (p. 257) El circuncentro es el punto de intersección de las tres mediatrices de un triángulo.



$QC = SC = RC$

C is the circumcenter.

Circumference (p. 388) The circumference of a circle is the distance around the circle. Given the radius r of a circle, you can find its circumference C by using the formula $C = 2\pi r$.

Circunferencia (p. 388) La circunferencia de un círculo es la distancia alrededor del círculo. Dado el radio r de un círculo, se puede hallar la circunferencia C usando la fórmula $C = 2\pi r$.

$C = 2\pi r$
$= 2\pi(4)$
$= 8\pi$

4

Circumference is the distance around the circle.

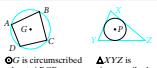
EXAMPLES

Circumference of a sphere (p. 558) *See* **sphere.**

Circunferencia de una esfera (p. 558) *Ver* **sphere.**

Circumscribed about (pp. 257, 585) A circle is circumscribed about a polygon if the vertices of the polygon are on the circle. A polygon is circumscribed about a circle if all the sides of the polygon are tangent to the circle.

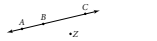
Circunscrito en (pp. 257, 585) Un círculo está circunscrito en un polígono si los vértices del polígono están en el círculo. Un polígono está circunscrito en un círculo si todos los lados del polígono son tangentes al círculo.



$\odot G$ is circumscribed about $ABCD$. $\triangle XYZ$ is circumscribed about $\odot P$.

Collinear points (p. 11) Collinear points lie on the same line.

Puntos colineales (p. 11) Los puntos colineales son los que están sobre la misma recta.



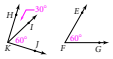
Points A, B, and C are collinear, but points A, B, and Z are noncollinear.

Compass (p. 34) A compass is a geometric tool used to draw circles and parts of circles, called arcs.

Compás (p. 34) El compás es un instrumento usado para dibujar círculos y partes de círculos, llamados arcos.

Complementary angles (p. 96) Two angles are complementary angles if the sum of their measures is 90.

Ángulos complementarios (p. 96) Dos ángulos son complementarios si la suma de sus medidas es igual a 90.



$\angle HKI$ and $\angle IKJ$ are complementary angles, as are $\angle HKI$ and $\angle EFG$.

Composite space figures (p. 547) A composite space figure is the combination of two or more figures into one object.

Figuras geométricas compuestas (p. 547) Una figura geométrica compuesta es la combinación de dos o más figuras en un mismo objeto.

Composition of transformations (p. 642) A composition of two transformations is a transformation in which a second transformation is performed on the image of a first transformation.

Composición de transformaciones (p. 642) Una composición de dos transformaciones es una transformación en la cual una segunda transformación se realiza sobre la imagen de una primera.

If you reflect $\triangle ABC$ in line m to get $\triangle A'B'C'$ and then reflect $\triangle A'B'C'$ in line n to get $\triangle A''B''C''$, you perform a composition of transformations.

EXAMPLES

Concave polygon (p. 144) *See* **polygon.**

Polígono cóncavo (p. 144) *Ver* **polygon.**

Concentric circles (p. 388) Concentric circles lie in the same plane and have the same center.

Círculos concéntricos (p. 388) Los círculos concéntricos están en el mismo plano y tienen el mismo centro.

The two circles both have center D and are therefore concentric.

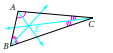
Conclusion (p. 68) The conclusion is the part of an *if-then* statement (conditional) that follows *then*.

Conclusión (p. 68) La conclusión es lo que sigue a la palabra *entonces* en un enunciado condicional (*Si..., entonces...*).

In the statement, "If it rains, then I will go outside," the *conclusion* is "I will go outside."

Concurrent lines (p. 257) Concurrent lines are three or more lines that meet in one point. The point at which they meet is the *point of concurrency*.

Rectas concurrentes (p. 257) Las rectas concurrentes son tres o más rectas que se unen en un punto. El punto en que se unen es el *punto de concurrencia*.



Point E is the point of concurrency of the bisectors of the angles of $\triangle ABC$. The bisectors are concurrent.

Conditional (p. 68) A conditional is an *if-then* statement.

Condicional (p. 68) Un enunciado condicional es del tipo *si..., entonces...*

If you act politely, *then* you will earn respect.

Cone (p. 539) A cone is a three-dimensional figure that has a circular *base*, a *vertex* not in the plane of the circle, and a curved lateral surface, as shown in the diagram. The *altitude* of a cone is the perpendicular segment from the vertex to the plane of the base. The *height* is the length of the altitude. In a *right cone,* the altitude contains the center of the base. The *slant height* of a right cone is the distance from the vertex to the edge of the base.

Cono (p. 539) Un cono es una figura tridimensional que tiene una *base* circular, un *vértice* que no está en el plano del círculo y una superficie lateral curvada (indicada en el diagrama). La *altura* de un cono es el segmento perpendicular desde el vértice hasta el plano de la base. La *altura*, por extensión, es la longitud de la altura. Un *cono recto* es un cono cuyo altura contiene el centro de la base. *La longitud de la generatriz* de un cono recto es la distancia desde el vértice hasta el borde de la base.

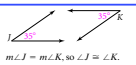
Congruence transformation (p. 634) *See* **isometry.**

Transformación de congruencia (p. 634) *Ver* **isometry.**

EXAMPLES

Congruent angles (p. 29) Congruent angles are angles that have the same measure.

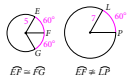
Ángulos congruentes (p. 29) Los ángulos congruentes son ángulos que tienen la misma medida.



$m\angle J = m\angle K$, so $\angle J \cong \angle K$.

Congruent arcs (p. 389) Congruent arcs are arcs that have the same measure and are in the same circle or congruent circles.

Arcos congruentes (p. 389) Arcos congruentes son arcos que tienen la misma medida y están en el mismo círculo o en círculos congruentes.



$\overset{\frown}{EF} \cong \overset{\frown}{FG}$ $\quad \overset{\frown}{EF} \ncong \overset{\frown}{LP}$

Congruent circles (p. 386) Congruent circles are circles whose radii are congruent.

Círculos congruentes (p. 386) Los círculos congruentes son círculos cuyos radios son congruentes.

$\odot A$ and $\odot B$ have the same radius, so $\odot A \cong \odot B$.

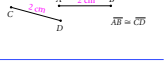
Congruent polygons (p. 180) Congruent polygons are polygons that have corresponding sides congruent and corresponding angles congruent.

Polígonos congruentes (p. 180) Los polígonos congruentes son polígonos cuyos lados correspondientes son congruentes y cuyos ángulos correspondientes son congruentes.

$\triangle DEF \cong \triangle GHI$

Congruent segments (p. 25) Congruent segments are segments that have the same length.

Segmentos congruentes (p. 25) Los segmentos congruentes son segmentos que tienen la misma longitud.



$\overline{AB} \cong \overline{CD}$

Conjecture (p. 5) A conjecture is a conclusion reached by using inductive reasoning.

Conjetura (p. 5) Una conjetura es una conclusión obtenida usando el razonamiento inductivo.

As you walk down the street, you see many people holding unopened umbrellas. You conjecture that the forecast must call for rain.

Consecutive angles (p. 295) Consecutive angles of a polygon share a common side.

Ángulos consecutivos (p. 295) Los ángulos consecutivos de un polígono tienen un lado común.

In $\square JKLM$, $\angle J$ and $\angle M$ are consecutive angles, as are $\angle J$ and $\angle K$. $\angle J$ and $\angle L$ are *not* consecutive.

EXAMPLES

Construction (p. 34) A construction is a geometric figure made with only a straightedge and compass.

Construcción (p. 34) Una construcción es una figura geométrica trazada solamente con una regla sin graduación y un compás.

The diagram shows the construction (in progress) of a line perpendicular to a line ℓ through a point P on ℓ.

Contrapositive (p. 264) The contrapositive of the conditional "if p, then q" is the conditional "if not q, then not p." A conditional and its contrapositive always have the same truth value.

Contrapositivo (p. 264) El contrapositivo del condicional "si p, entonces q" es el condicional "si no q, entonces no p." Un condicional y su contrapositivo siempre tienen el mismo valor verdadero.

Conditional: If a figure is a triangle, then it is a polygon.
Contrapositive: If a figure is not a polygon, then it is not a triangle.

Converse (p. 69) The converse of the conditional "if p, then q" is the conditional "if q, then p."

Recíproco (p. 69) El recíproco del condicional "si p, entonces q" es el condicional "si q, entonces p."

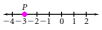
Conditional: If you live in Cheyenne, then you live in Wyoming.
Converse: If you live in Wyoming, then you live in Cheyenne.

Convex polygon (p. 144) *See* **polygon.**

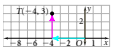
Polígono convexo (p. 144) *Ver* **polygon.**

Coordinate(s) of a point (pp. 25, 43) The coordinate of a point is its distance and direction from the origin of a number line. The coordinates of a point on a coordinate plane are in the form (x, y), where x is the x-coordinate and y is the y-coordinate.

Coordenada(s) de un punto (pp. 25, 43) La coordenada de un punto es su distancia y dirección desde el origen en una recta numérica. Las coordenadas de un punto en un plano de coordenadas se expresan como (x, y), donde x es la coordenada x y y es la coordenada y.



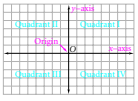
The coordinate of P is -3.



The coordinates of T are $(-4, 3)$.

Coordinate plane (p. 43) The coordinate plane is formed by two number lines, called the axes, intersecting at right angles. The x-axis is the horizontal axis, and the y-axis is the vertical axis. The two axes meet at the origin, $O(0, 0)$. The axes divide the plane into four quadrants.

Plano de coordenadas (p. 43) El plano de coordenadas se forma con dos rectas numéricas, llamadas ejes, que se cortan en ángulos rectos. El eje x es el eje horizontal y el eje y es el eje vertical. Los dos ejes se unen en el origen, $O(0, 0)$. Los ejes dividen el plano de coordenadas en cuatro cuadrantes.



EXAMPLES

Coordinate proof (p. 244) *See* **proof.**

Prueba de coordenadas (p. 244) *Ver* **proof.**

Coplanar figures (p. 11) Coplanar figures are figures in the same plane.

Figuras coplanares (p. 11) Las figuras coplanares son las figuras que estan localizados en el mismo plano.

Point C and $\overleftrightarrow{AB}$ are coplanar but points A, B, C, and Q are noncoplanar.

Corollary (p. 212) A corollary is a statement that follows directly from a theorem.

Corolario (p. 212) Un corolario es un enunciado que procede directamente de un teorema.

Theorem: If two sides of a triangle are congruent, then the angles opposite those sides are congruent.
Corollary: If a triangle is equilateral, then it is equiangular.

Corresponding angles (p. 115) Corresponding angles lie on the same side of the transversal t and in corresponding positions relative to ℓ and m.

Ángulos correspondientes (p. 115) Los ángulos correspondientes están en el mismo lado de la transversal t y en las correspondientes posiciones relativas a ℓ y m.

$\angle 1$ and $\angle 2$ are corresponding angles, as are $\angle 3$ and $\angle 4$, $\angle 5$ and $\angle 6$, and $\angle 7$ and $\angle 8$.

Cosine ratio (p. 477) *See* **trigonometric ratios.**

Razón coseno (p. 477) *Ver* **trigonometric ratios.**

Counterexample (pp. 5, 69) A counterexample to a statement is a particular example or instance of the statement that makes the statement false.

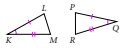
Contraejemplo (pp. 5, 69) Un contraejemplo a un enunciado es un ejemplo particular o caso que demuestra que el enunciado no es verdadero.

Statement: If the name of a state begins with W, then that state does not border an ocean.
Counterexample: Washington

CPCTC (p. 203) CPCTC is an abbreviation for "corresponding parts of congruent triangles are congruent."

EXAMPLE By the SAS Congruence Postulate, $\triangle KLM \cong \triangle QPR$. By CPCTC, you also know that $\angle L \cong \angle P$, $\angle M \cong \angle R$, and $\overline{LM} \cong \overline{PR}$.

CPCTC (p. 203) CPCTC es una abreviatura para "partes correspondientes de triángulos congruentes son congruentes."



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EXAMPLES

Cross-Product Property (p. 417) The product of the extremes of a proportion is equal to the product of the means.

Propiedad del producto en equis (p. 417) El producto de los extremos de una proporción es igual al producto de los medios.

If $\frac{4}{x} = \frac{12}{21}$, then $21x = 3 \cdot 12$.

Cross section (p. 522) A cross section is the intersection of a solid and a plane.

Sección de corte (p. 522) Una sección de corte es la intersección de un plano y un sólido.

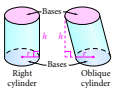
The cross section is a circle.

Cube (p. 512) A cube is a polyhedron with six faces, each of which is a square.

Cubo (p. 512) Un cubo es un poliedro de seis caras, cada una de las caras es un cuadrado.

Cylinder (p. 530) A cylinder is a three-dimensional figure with two congruent circular *bases* that lie in parallel planes. An *altitude* of a cylinder is a perpendicular segment that joins the planes of the bases. Its length is the *height* of the cylinder. In a *right cylinder,* the segment joining the centers of the bases is an altitude. In an *oblique cylinder,* the segment joining the centers of the bases is not perpendicular to the planes containing the bases.

Cilindro (p. 530) Un cilindro es una figura tridimensional con dos *bases* congruentes circulares en planos paralelos. Una *altura* de un cilindro es un segmento perpendicular que une los planos de las bases. Su longitud es, por extensión, la *altura* del cilindro. En un *cilindro recto,* el segmento que une los centros de las bases es una altura. En un *cilindro oblicuo,* el segmento que une los centros de las bases no es perpendicular a los planos que contienen las bases.



D

Decagon (p. 144) A decagon is a polygon with ten sides.

Decágono (p. 144) Un decágono es un polígono de diez lados.

Deductive reasoning (p. 82) Deductive reasoning is a process of reasoning logically from given facts to a conclusion.

Razonamiento deductivo (p. 82) El razonamiento deductivo es un proceso de razonmiento lógico que parte de hechos dados hasta llegar a una conclusión.

Based on the fact that the sum of any two even numbers is even, you can deduce that the product of any whole number and any even number is even.

EXAMPLES

Diagonal (p. 144) *See* **polygon.**

Diagonal (p. 144) *Ver* **polygon.**

Diameter of a circle (p. 386) A diameter of a circle is a segment that contains the center of the circle and whose endpoints are on the circle. The term *diameter* can also mean the length of this segment.

Diámetro de un círculo (p. 386) Un diámetro de un círculo es un segmento que contiene el centro del círculo y cuyos extremos están en el círculo. El término *diámetro* también puede referirse a la longitud de este segmento.

$\overline{DM}$ is a diameter of $\odot C$.

Diameter of a sphere (p. 558) The diameter of a sphere is a segment passing through the center, with endpoints on the sphere.

Diámetro de una esfera (p. 558) El diámetro de una esfera es un segmento que contiene el centro de la esfera y cuyos extremos están en la esfera.

Dilation (p. 674) A dilation, or *similarity transformation,* is a transformation that has *center* C and *scale factor* n, where $n > 0$, and maps a point R to R' in such a way that R' is on $\overline{CR}$ and $CR' = n \cdot CR$. The center of a dilation is its own image. If $n > 1$, the dilation is an *enlargement,* and if $0 < n < 1$, the dilation is a *reduction.*

Dilatación (p. 674) Una dilatación, o *transformación de semejanza,* tiene *centro* C y *factor de escala* n para $n > 0$, y asocia un punto R a R' de tal modo que R' está en $\overline{CR}$ y $CR' = n \cdot CR$. El centro de una dilatación es su propia imagen. Si $n > 1$, la dilatación es un *aumento,* y si $0 < n < 1$, la dilatación es una *reducción.*

$\overline{R'Q'}$ is the image of $\overline{RQ}$ under a dilation with center C and scale factor 3.

Direction of a vector (p. 490) *See* **vector.**

Dirección de un vector (p. 490) *Ver* **vector.**

Distance from a point to a line (p. 250) The distance from a point to a line is the length of the perpendicular segment from the point to the line.

Distancia desde un punto hasta una recta (p. 250) La distancia desde un punto hasta una recta es la longitud del segmento perpendicular que va desde el punto hasta la recta.

The distance from point P to a line ℓ is PT.

Dodecagon (p. 144) A dodecagon is a polygon with twelve sides.

Dodecágono (p. 144) Un dodecágono es un polígono de doce lados.

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E

EXAMPLES

Edge (p. 512) *See* **polyhedron.**

Arista (p. 512) *Ver* **polyhedron.**

Endpoint (p. 17) *See* **ray; segment.**

Extremo (p. 17) *Ver* **ray; segment.**

Enlargement (p. 674) *See* **dilation.**

Aumento (p. 674) *Ver* **dilation.**

Equiangular triangle or polygon (pp. 133, 146) An equiangular triangle (polygon) is a triangle (polygon) whose angles are all congruent.

Triángulo o polígono equiángulo (pp. 133, 146) Un triángulo (polígono) equiángulo es un triángulo (polígono) cuyos ángulos son todos congruentes.

Each angle of the pentagon is a 108° angle.

Equilateral triangle or polygon (pp. 133, 146) An equilateral triangle (polygon) is a triangle (polygon) whose sides are all congruent.

Triángulo o polígono equilátero (pp. 133, 146) Un triángulo (polígono) equilátero es un triángulo (polígono) cuyos lados son todos congruentes.

Each side of the quadrilateral is 1.2 cm long.

Equivalent statements (p. 265) Equivalent statements are statements with the same truth value.

Enunciados equivalentes (p. 265) Los enunciados equivalentes son enunciados con el mismo valor verdadero.

The following statements are equivalent:
If a figure is a square, then it is a rectangle.
If a figure is not a rectangle, then it is not a square.

Euclidean geometry (p. 140) Euclidean geometry is a geometry of the plane in which Euclid's Parallel Postulate is accepted as true.

Geometría euclidiana (p. 140) La geometría euclidiana es una geometría del plano en donde el postulado paralelo de Euclides es verdadero.

In Euclidean geometry, there is exactly one line parallel to line ℓ through point P.

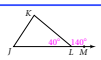
Extended proportion (p. 417) *See* **proportion.**

Proporción por extensión (p. 417) *Ver* **proportion.**

EXAMPLES

Exterior angle of a polygon (p. 133) An exterior angle of a polygon is an angle formed by a side and an extension of an adjacent side.

Ángulo exterior de un polígono (p. 133) El ángulo exterior de un polígono es un ángulo formado por un lado y una extensión de un lado adyacente.



$\angle KLM$ is an exterior angle of $\triangle JKL$.

F

Face (p. 512) *See* **polyhedron.**

Cara (p. 512) *Ver* **polyhedron.**

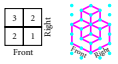
Flip (p. 635) *See* **reflection.**

Flow proof (p. 123) *See* **proof.**

Prueba de flujo (p. 123) *Ver* **proof.**

Foundation drawing (p. 521) A foundation drawing shows the base of a structure and the height of each part.

Dibujo de fundación (p. 521) Un dibujo de fundación muestra la base de una estructura y la altura de cada parte.



The first drawing is a foundation drawing, and the second is an isometric drawing based on the foundation drawing.

G

Geometric mean (p. 440) The geometric mean is the number x such that $\frac{a}{x} = \frac{x}{b}$, where a, b and x are positive numbers.

Media geométrica (p. 440) La media geométrica es el número x tanto que $\frac{a}{x} = \frac{x}{b}$, donde a, b y x son números positivos.

The geometric mean of 6 and 24 is 12.

$\frac{6}{x} = \frac{x}{24} \rightarrow x^2 = 144 \rightarrow x = 12$

Geometric probability (p. 402) Geometric probability is a probability that uses a geometric model in which points represent outcomes.

Probabilidad geométrica (p. 402) La probabilidad geométrica es una probabilidad que utiliza un modelo geométrico donde es usan puntos para representar resultados.

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EXAMPLES

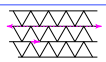
Glide reflection (p. 656) A glide reflection is the composition of a translation followed by a reflection in a line parallel to the translation vector.

Reflexión deslizada (p. 656) Una reflexión deslizada es la composición de una traslación seguida de una reflexión en una recta paralela al vector de traslación.

The blue G in the diagram is a glide reflection image of the black G.

Glide reflectional symmetry (p. 668) Glide reflectional symmetry is the type of symmetry for which there is a glide reflection that maps a figure onto itself.

Simetría por reflexión deslizada (p. 668) La simetría por reflexión deslizada es un tipo de simetriá en la que una reflexión deslizada vuelve a trazar una figura sobre sí misma.



The tessellation shown can be mapped onto itself by a glide reflection in the given glide vector and reflection line.

Golden rectangle, Golden ratio (p. 425) A *golden rectangle* is a rectangle that can be divided into a square and a rectangle that is similar to the original rectangle. The *golden ratio* is the ratio of the length of a golden rectangle to its width. The value of the golden ratio is $\frac{1+\sqrt{5}}{2}$, or about 1.62.

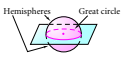
Rectángulo áureo, razón áurea (p. 425) Un *rectángulo áureo* es un rectángulo que se puede dividir en un cuadrado y un rectángulo semejante al rectángulo original. La *razón áurea* es la razón de la longitud de un rectángulo áureo en relación a su ancho. El valor de la razón áurea es $\frac{1+\sqrt{5}}{2}$ o aproximadamente 1.62.

ABCD is a rectangle.
ADFE is a square.

$ABCD \sim BCFE$

Great circle (p. 558) A great circle is the intersection of a sphere and the plane containing the center of the sphere. A great circle divides a sphere into two hemispheres.

Círculo máximo(p. 558) Un círculo máximo es la intersección de una esfera y un plano que contiene el centro de la esfera. Un círculo máximo divide una esfera en dos hemisferios.



H

Height *See* **cone; cylinder; parallelogram; prism; pyramid; trapezoid; triangle.**

Altura *Ver* **cone; cylinder; parallelogram; prism; pyramid; trapezoid; triangle.**

EXAMPLES

Hemisphere (p. 558) *See* **great circle.**

Hemisferio (p. 558) *Ver* **great circle.**

Heptagon (p. 144) A heptagon is a polygon with seven sides.

Heptágono (p. 144) Un heptágono es un polígono de siete lados.

Heron's Formula (p. 353) Heron's Formula is a formula for finding the area of a triangle given the lengths of its sides.

Fórmula de Herón (p. 353) La fórmula de Herón se usa para hallar el área de un triángulo, dadas las longitudes de sus lados.

$A = \sqrt{s(s-a)(s-b)(s-c)}$, where s is half the perimeter (semi-perimeter) of the triangle and a, b, and c are the lengths of its sides.

Hexagon (p. 144) A hexagon is a polygon with six sides.

Hexágono (p. 144) Un hexágono es un polígono de seis lados.

Hypotenuse (p. 217) *See* **right triangle.**

Hipotenusa (p. 217) *Ver* **right triangle.**

Hypothesis (p. 68) The hypothesis is the part that follows *if* in an *if-then* statement (conditional).

Hipótesis (p. 68) La hipótesis es lo que sigue a la palabra *si* en un *enunciado condicional* (*si..., entonces...*).

In the statement "If she leaves, then I will go with her," the hypothesis is "she leaves."

I

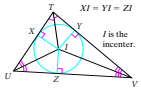
Identity (p. 478) An identity is an equation that is true for all allowed values of the variable.

Identidad (p. 478) Una identidad es una ecuación que es verdadera para todos los valores posibles de las variables.

$\sin x^\circ = \cos(90 - x)^\circ$

Incenter of a triangle (p. 257) The incenter of a triangle is the point of concurrency of the angle bisectors of the triangle.

Incentro de un triángulo (p. 257) El incentro de un triángulo es el punto donde concurren las tres bisectrices de los ángulos del triángulo.



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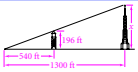
EXAMPLES

Indirect measurement (p. 434) Indirect measurement is a way of measuring things that are difficult to measure directly.

EXAMPLE By measuring the distances shown in the diagram and using proportions of similar figures, you can find the height of the taller tower. $\frac{196}{540} = \frac{x}{1300} \rightarrow x = 472$ ft

Medición indirecta (p. 434) La medición indirecta es un modo de medir cosas difíciles de medir directamente.



Indirect proof (p. 265) *See* **indirect reasoning: proof.**

Prueba indirecta (p. 265) *Ver* **indirect reasoning: proof.**

Indirect reasoning (p. 265) Indirect reasoning is a type of reasoning in which all possibilities are considered and then all but one are proved false. The remaining possibility must be true.

Razonamiento indirecto (p. 265) El razonamiento indirecto es un tipo de razonamiento en el que todas las posibilidades se consideran, y luego todas menos una resultan falsas. La posibilidad que queda debe ser verdadera.

Eduardo spent more than $60 on two books at a store. Prove that at least one book costs more than $30.

Proof: Suppose neither costs more than $30. Then he spent no more than $60 at the store. Since this contradicts the given information, at least one book costs more than $30.

Inductive reasoning (p. 4) Inductive reasoning is a type of reasoning that reaches conclusions based on a pattern of specific examples or past events.

Razonamiento inductivo (p. 4) El razonamiento inductivo es un tipo de razonamiento en el cual se llega a conclusiones con base en un patrón de ejemplos específicos o sucesos pasados.

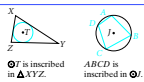
You see four people walk into a building. Each person emerges with a small bag containing hot food. You use inductive reasoning to conclude that this building contains a restaurant.

Initial point of a vector (p. 488) *See* **vector.**

Punto inicial de un vector (p. 488) *Ver* **vector.**

Inscribed in (pp. 257, 585) A circle is inscribed in a polygon if the sides of the polygon are tangent to the circle. A polygon is inscribed in a circle if the vertices of the polygon are on the circle.

Inscrito en (pp. 257, 585) Un círculo está inscrita en un polígono si los lados del polígono son tangentes al círculo. Un polígono está inscrito en un círculo si los vértices del polígono están en el círculo.



$\odot T$ is inscribed in $\triangle XYZ$.

$ABCD$ is inscribed in $\odot I$.

Inscribed angle (p. 598) An angle is inscribed in a circle if the vertex of the angle is on the circle and the sides of the angle are chords of the circle.

Ángulo inscrito (p. 598) Un ángulo está inscrito en un círculo si el vértice del ángulo está en el círculo y los lados del ángulo son cuerdas del círculo.

$\angle C$ is inscribed in $\odot M$.

EXAMPLES

Intercepted arc (p. 598) An intercepted arc is an arc of a circle having endpoints on the sides of an inscribed angle, and its other points in the interior of the angle.

Arco interceptor (p. 598) Un arco interceptor es un arco de un círculo cuyos extremos están en los lados de un ángulo inscrito y los puntos restantes están en el interior del ángulo.

$\overset{\frown}{UV}$ is the intercepted arc of inscribed angle $\angle T$.

Inverse (p. 264) The inverse of the conditional "if p, then q" is the conditional "if not p, then not q."

Inverso (p. 264) El inverso del condicional "si p, entonces q," es el condicional "si no p, entonces no q."

Conditional: If a figure is a square, then it is a parallelogram.
Inverse: If a figure is not a square, then it is not a parallelogram.

Isometric drawing (p. 520) An isometric drawing of a three-dimensional object shows a corner view of a figure. It is not drawn in perspective and distances are not distorted.

Dibujo isométrico (p. 520) Un dibujo isométrico de un objeto tridimensional muestra una vista desde una esquina de la figura. No se muestra en perspectiva y las distancias no aparecen distorcionades.

Isometry (p. 634) An isometry, also known as a *congruence transformation*, is a transformation in which an original figure and its image are congruent.

Isometría (p. 634) Una isometría, conocida también como una *transformación de congruencia*, es una transformación en donde una figura original y su imagen son congruentes.

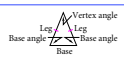
The four isometries are reflections, rotations, translations, and glide reflections.

Isosceles trapezoid (p. 288) An isosceles trapezoid is a trapezoid whose nonparallel opposite sides are congruent.

Trapecio isósceles (p. 288) Un trapecio isósceles es un trapecio cuyos lados opuestos no paralelos son congruentes.

Isosceles triangle (pp. 133, 211) An isosceles triangle is a triangle that has at least two congruent sides. If there are two congruent sides, they are called *legs*. The *vertex angle* is between them. The third side is called the *base* and the other two angles are called the *base angles*.

Triángulo isósceles (pp. 133, 211) Un triángulo isósceles es un triángulo que tiene por lo menos dos lados congruentes. Si tiene dos lados congruentes, éstos se llaman *catetos*. Entre ellos se encuentra el *ángulo de vértice*. El tercer lado se llama *base* y los otras dos ángulos se llaman *ángulos de base*.



English/Spanish Glossary

K

EXAMPLES

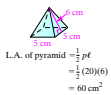
Kite (p. 288) A kite is a quadrilateral with two pairs of congruent adjacent sides and no opposite sides congruent.

Cometa (p. 288) Una cometa es un cuadrilátero con dos pares de lados congruentes adyacentes, pero sin lados opuestos congruentes.

L

Lateral area (pp. 529, 530, 537, 539) The lateral area of a prism or pyramid is the sum of the areas of the lateral faces. The lateral area of a cylinder or cone is the area of the curved surface. A list of lateral area formulas is on p. 727.

Área lateral (pp. 529, 530, 537, 539) El área lateral de un prisma o pirámide es la suma de las áreas de sus caras laterales. El área lateral de un cilindro o de un cono es el área de la superficie curvada. Una lista de las fórmulas de áreas laterales está en la p. 727.



L.A. of pyramid $= \frac{1}{2}p\ell$
$= \frac{1}{2}(20)(6)$
$= 60\text{ cm}^2$

Lateral face *See* **prism; pyramid.**

Cara lateral *Ver* **prism; pyramid.**

Leg *See* **isosceles triangle; right triangle; trapezoid.**

Cateto *Ver* **isosceles triangle; right triangle; trapezoid.**

Line (pp. 11, 140) In Euclidean geometry, a line is undefined. You can think of a line as a series of points that extend in two directions without end. In spherical geometry, you can think of a line as a great circle of a sphere.

Línea (pp. 11, 140) En la geometría euclidiana, una recta es indefinido. Puedes imaginarte a una recta como una serie de puntos que se extienden en dos direcciones sin fin. En la geometría esférica, puedes imaginarte a una recta como un círculo máximo de una esfera.

Line symmetry (p. 662) *See* **reflectional symmetry.**

Simetría lineal (p. 662) *Ver* **reflectional symmetry.**

Locus (p. 621) A locus is a set of points, all of which meet a stated condition.

Lugar geométrico (p. 621) Un lugar geométrico es un conjunto de puntos de que todos cumplen una condición dada.

The points in blue are the locus of points in a plane 1 cm from $\overline{DC}$.

M

EXAMPLES

Magnitude of a vector (p. 490) *See* **vector.**

Magnitud de un vector (p. 490) *Ver* **vector.**

Major arc (p. 387) A major arc of a circle is an arc that is larger than a semicircle.

Arco mayor (p. 387) Un arco mayor de un círculo es cualquier arco más grande que un semicírculo.

$\overset{\frown}{DEF}$ is a major arc of $\odot C$.

Map (p. 635) *See* **transformation.**

Trazar (p. 635) *Ver* **transformation.**

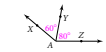
Matrix (p. 640) A matrix is a rectangular array of numbers. Each number in a matrix is called an *entry*.

Matriz (p. 640) Una matriz es un conjunto de números dispuestos en forma de rectángulo. Cada número de una matriz se llama *elemento* de la matriz.

The matrix $\begin{bmatrix} 1 & -2 \\ 0 & 13 \end{bmatrix}$ has dimensions 2×2. The number 1 is the entry in the first row and first column.

Measure of an angle (p. 27) The measure of an angle is a number of degrees greater than 0 and less than or equal to 180. An angle can be measured with a protractor.

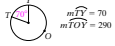
Medida de un ángulo (p. 27) La medida de un ángulo es un número de grados mayor de 0 y menor o igual a 180. Un ángulo se puede medir con un transportador.



$m\angle ZAY = 80$, $m\angle YAX = 60$, and $m\angle ZAX = 140$.

Measure of an arc (p. 387) The measure of a minor arc is the measure of its central angle. The measure of a major arc is 360 minus the measure of its related minor arc.

Medida de un arco (p. 387) La medida de un arco menor es la medida de su ángulo central. La medida de un arco mayor es 360 menos la medida en grados de su arco menor correspondiente.



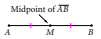
$m\overset{\frown}{TY} = 70$
$m\overset{\frown}{TOY} = 290$

Median of a triangle (p. 258) A median of a triangle is a segment that has as its endpoints a vertex of the triangle and the midpoint of the opposite side.

Mediana de un triángulo (p. 258) Una mediana de un triángulo es un segmento que tiene en su extremo el vértice del triángulo y el punto medio del lado opuesto.

Midpoint of a segment (p. 26) A midpoint of a segment is the point that divides the segment into two congruent segments.

Punto medio de un segmento (p. 26) El punto medio de un segmento es el punto que divide el segmento en dos segmentos congruentes.



English/Spanish Glossary

EXAMPLES

Midsegment of a trapezoid (p. 332) The midsegment of a trapezoid is the segment that joins the midpoints of the nonparallel opposite sides of a trapezoid.

Segmento medio de un trapecio (p. 332) El segmento medio de trapecio es el segmento que une los puntos medios de los lados paralelos de un trapecio.

Midsegment of a triangle (p. 243) A midsegment of a triangle is the segment that joins the midpoints of two sides of the triangle.

Segmento medio de un triángulo (p. 243) Un segmento medio de un triángulo es el segmento que une los puntos medios de dos lados del triángulo.

Minor arc (p. 387) A minor arc is an arc that is smaller than a semicircle.

Arco menor (p. 387) Un arco menor de un círculo es un arco más corto que un semicírculo.

$\overset{\frown}{KC}$ is a minor arc of $\odot S$.

N

Negation (p. 264) A negation of a statement has the opposite meaning of the original statement.

Negación (p. 264) La negación de un enunciado tiene el sentido opuesto del enunciado original.

Statement: The angle is obtuse.
Negation: The angle is not obtuse.

Net (p. 512) A net is a two-dimensional pattern that you can fold to form a three-dimensional figure.

Patrón (p. 512) Un patrón es una figura bidimensional que se puede doblar para formar una figura tridimensional.

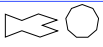
The net shown can be folded into a prism with pentagonal bases.

***n*-gon (p. 144)** An n-gon is a polygon with n sides.

***n*-ágono (p. 144)** Un n-ágono es un polígono de n lados.

Nonagon (p. 144) A nonagon is a polygon with nine sides.

Nonágono (p. 144) Un nonágono es un polígono de nueve lados.



O

Oblique cylinder or prism *See* **cylinder; prism.**

Cilindro oblicuo o prisma *Ver* **cylinder; prism.**

Obtuse angle (p. 28) An obtuse angle is an angle whose measure is between 90 and 180.

Ángulo obtuso (p. 28) Un ángulo obtuso es un ángulo que mide entre 90 y 180.

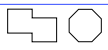
EXAMPLES

Obtuse triangle (p. 133) An obtuse triangle has one obtuse angle.

Triángulo obtusángulo (p. 133) Un triángulo obtusángulo tiene un ángulo obtuso.

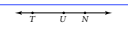
Octagon (p. 144) An octagon is a polygon with eight sides.

Octágono (p. 144) Un octágono es un polígono de ocho lados.



Opposite rays (p. 18) Opposite rays are collinear rays with the same endpoint. They form a line.

Rayos opuestos (p. 18) Los rayos opuestos son rayos colineales con el mismo extremo. Forman una recta.



$\overrightarrow{UT}$ and $\overrightarrow{UN}$ are opposite rays.

Orientation (p. 635) Two congruent figures have *opposite* orientation if a reflection is needed to map one onto the other. If a reflection is not needed to map one figure onto the other, the figures have the same orientation.

Orientación (p. 635) Dos figuras congruentes tienen orientación *opuesta* si una reflexión es necesaria para trazar una sobre la otra. Si una reflexión no es necesaria para trazar una figura sobre la otra, las figuras tiene la misma orientación.

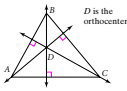
R Я The two R's have opposite orientation.

Origin (p. 43) *See* **coordinate plane.**

Origen (p. 43) *Ver* **coordinate plane.**

Orthocenter (p. 259) The orthocenter of a triangle is the point of intersection of the lines containing the altitudes of the triangle.

Ortocentro (p. 259) El ortocentro de un triángulo es el punto donde concurren las tres alturas del triángulo.



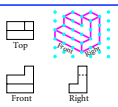
D is the orthocenter.

EXAMPLES

Orthographic drawing (p. 521) An orthographic drawing is the top view, front view, and right-side view of a three-dimensional figure.

EXAMPLE The diagram shows an isometric drawing (upper right) and the three views that make up an orthographic drawing.

Dibujo ortográfico (p. 521) Un dibujo ortográfico es la vista desde arriba, la vista de frente y la vista del lado derecho de una figura tridimensional.



P

Paragraph proof (p. 100) *See* **proof.**

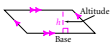
Prueba de párrafo (p. 100) *Ver* **proof.**

Parallel lines (pp. 18, 115) Two lines are parallel if they lie in the same plane and do not intersect. The symbol ∥ means "is parallel to."

Rectas paralelas (pp. 18, 115) Dos rectas son paralelas si están en el mismo plano y no se cortan. El símbolo ∥ significa "es paralelo a."

Parallelogram (p. 288) A parallelogram is a quadrilateral with two pairs of parallel sides. You can choose any side to be the *base*. An *altitude* is any segment perpendicular to the line containing the base drawn from the side opposite the base. The *height* is the length of an altitude.

Paralelogramo (p. 288) Un paralelogramo es un cuadrilátero con los dos pares de lados paralelos. Se puede escoger cualquier lado como la *base*. Una *altura* es un segmento perpendicular a la recta que contiene la base, trazada desde el lado opuesto a la base. La *altura*, por extensión, es la longitud de una altura.



Parallel planes (p. 19) Parallel planes are planes that do not intersect.

Planos paralelos (p. 19) Planos paralelos son planos que no se cortan.

Planes *Y* and *Z* are parallel.

Pentagon (p. 144) A pentagon is a polygon with five sides.

Pentágono (p. 144) El pentágono es un polígono de cinco lados.

Perimeter of a polygon (p. 51) The perimeter of a polygon is the sum of the lengths of its sides.

Perímetro de un polígono (p. 51) El perímetro de un polígono es la suma de las longitudes de sus lados.

$P = 4 + 4 + 5 + 3$
$= 16$ in.

EXAMPLES

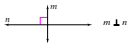
Perpendicular bisector (p. 35) The perpendicular bisector of a segment is a line, segment, or ray that is perpendicular to the segment at its midpoint.

Mediatriz (p. 35) La mediatriz de un segmento es una recta, segmento, o rayo que es perpendicular al segmento en su punto medio.

$\overline{YZ}$ is the perpendicular bisector of $\overline{AB}$. It is perpendicular to $\overline{AB}$ and intersects $\overline{AB}$ at midpoint *M*.

Perpendicular lines (p. 35) Perpendicular lines are lines that intersect and form right angles. The symbol ⊥ means "is perpendicular to."

Rectas perpendiculares (p. 35) Las rectas perpendiculares son rectas que se cortan y forman ángulos rectos. El símbolo ⊥ significa "es perpendicular a".



$m \perp n$

Perspective drawing (p. 518) Perspective drawing is a way of drawing objects on a flat surface so that they look the same way as they appear to the eye. In *one-point perspective*, there is one *vanishing point*. In *two-point perspective*, there are two vanishing points.

Dibujar en perspectiva (p. 518) Dibujar en perspectiva es una manera de dibujar objetos en una superficie plana de modo que se vean como los percibe el ojo humano. En la *perspectiva de un punto* hay un *punto de fuga*. En la *perspectiva de dos puntos* hay dos puntos de fuga.

One-point perspective

Two-point perspective

Pi (p. 388) Pi (π) is the ratio of the circumference of any circle to its diameter. The number π is irrational and is approximately 3.14159.

Pi (p. 388) Pi (π) es la razón de la circunferencia de cualquier círculo en relación a su diámetro. El número π es irracional y se aproxima a $\pi \approx 3.14159$.

$\pi = \frac{C}{d}$

Plane (p. 11) In Euclidean geometry, a plane is undefined. You can think of a plane as a flat surface that has no thickness. A plane contains many lines and extends without end in the directions of its lines.

Plano (p. 11) En la geometría euclidiana, un plano es indefinido. Puedes imaginarte a un plano como una superficie plana que no tiene grosor. Un plano tiene muchas rectas y se extiende sin fin en la misma dirección que todas las rectas.

Plane *ABC* or plane *Z*

Point (p. 11) In Euclidean geometry, a point is undefined. You can think of a point as a location. A point has no size.

Punto (p. 11) En la geometría euclidiana, un punto es indefinido. Puedes imaginarte a un punto como un lugar. Un punto no tiene dimensión.

Point of concurrency (p. 257) *See* **concurrent.**

Punto de concurrencia (p. 257) *Ver* **concurrent.**

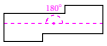
EXAMPLES

Point of tangency (p. 582) *See* **tangent to a circle.**

Punto de tangencia (p. 582) *Ver* **tangent to a circle.**

Point symmetry (p. 663) Point symmetry is the type of symmetry for which there is a rotation of 180° that maps a figure onto itself.

Simetría central (p. 663) La simetría central es un tipo de simetría en la que una figura se ha rotado 180° sobre sí misma.



Point-slope form (p. 154) The point-slope form for a nonvertical line with slope m and through point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

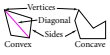
Forma punto-pendiente (p. 154) La forma punto-pendiente para una línea no vertical con pendiente m y que pasa por el punto (x_1, y_1) es $y - y_1 = m(x - x_1)$.

$y + 1 = 3(x - 4)$

In this equation, the slope is 3 and (x_1, y_1) is $(4, -1)$.

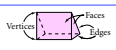
Polygon (p. 143) A polygon is a closed plane figure with at least three *sides* that are segments. The sides intersect only at their endpoints and no two adjacent sides are collinear. The *vertices* of the polygon are the endpoints of the sides. A *diagonal* is a segment that connects two nonconsecutive vertices. A polygon is *convex* if no diagonal contains points outside the polygon. A polygon is *concave* if a diagonal contains points outside the polygon.

Polígono (p. 143) Un polígono es una figura plana cerrada de, por lo menos, tres *lados*. Los lados se cortan solo en los extremos. No hay dos lados adyacentes que sean colineales. Los *vértices* del polígono son los extremos de los lados. Una *diagonal* es un segmento que une dos vértices no consecutivos. Un polígono es *convexo* si ninguna diagonal contiene puntos fuera del polígono. Un polígono es *cóncavo* si una diagonal contiene puntos fuera del polígono.



Polyhedron (p. 512) A polyhedron is a three-dimensional figure whose surfaces, or *faces*, are polygons. The vertices of the polygons are the *vertices* of the polyhedron. The intersections of the faces are the *edges* of the polyhedron.

Poliedro (p. 512) Un poliedro es una figura tridimensional cuyas superficies, o *caras*, son polígonos. Los vértices de los polígonos son los *vértices* del poliedro. Las intersecciones de las caras son las *aristas* del poliedro.



Postulate (p. 12) A postulate, or *axiom*, is an accepted statement of fact.

Postulado (p. 12) Un postulado, o *axioma*, es un enunciado que se acepta como un hecho.

Postulate: Through any two points there is exactly one line.

Preimage (p. 634) *See* **transformation.**

Preimagen (p. 634) *Ver* **transformation.**

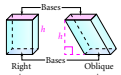
EXAMPLES

Prime notation (p. 635) *See* **transformation.**

Notación prima (p. 635) *Ver* **transformation.**

Prism (p. 528) A prism is a polyhedron with two congruent and parallel faces, which are called the *bases.* The other faces, which are parallelograms, are called the *lateral faces.* An *altitude* of a prism is a perpendicular segment that joins the planes of the bases. Its length is the *height* of the prism. A *right prism* is one whose lateral faces are rectangular regions and a lateral edge is an altitude. In an *oblique prism,* some or all of the lateral faces are nonrectangular.

Prisma (p. 528) Un prisma es un poliedro con dos caras congruentes paralelas llamadas *bases.* Las otras caras son paralelogramos llamados *caras laterales.* La *altura* de un prisma es un segmento perpendicular que une los planos de las bases. Su longitud es también la *altura* del prisma. En un *prisma recto,* las caras laterales son rectangulares y una de las aristas laterales es la altura. En un *prisma oblicuo,* algunas o todas las caras laterales no son rectangulares.



Proof (pp. 100, 117, 123, 242, 263) A proof is a convincing argument that uses deductive reasoning. A proof can be written in many forms. In a *two-column proof,* the statements and reasons are aligned in columns. In a *paragraph proof,* the statements and reasons are connected in sentences. In a *flow proof,* arrows show the logical connections between the statements. In a *coordinate proof,* a figure is drawn on a coordinate plane and the formulas for slope, midpoint, and distance are used to prove properties of the figure. An *indirect proof* involves the use of indirect reasoning.

Prueba (pp. 100, 117, 123, 242, 263) Una prueba es un argumento convincente en el cual se usa el razonamiento deductivo. Una prueba se puede escribir de varias maneras. En una *prueba de dos columnas,* los enunciados y las razones se alinean en columnas. En una *prueba de párrafo,* los enunciados y razones están unidos en oraciones. En una *prueba de flujo,* hay flechas que indican las conexiones lógicas entre enunciados. En una *prueba de coordenadas,* se dibuja una figura en un plano de coordenadas y se usan las fórmulas de la pendiente, punto medio y distancia para probar las propiedades de la figura. Una *prueba indirecta* incluye el uso de razonamiento indirecto.

Given: $\triangle EFG$, with right angle $\angle F$

Prove: $\angle E$ and $\angle G$ are complementary.

Paragraph Proof: Because $\angle F$ is a right angle, $m\angle F = 90$. By the Triangle Angle-Sum Theorem, $m\angle E + m\angle F + m\angle G = 180$. By substitution, $m\angle E + 90 + m\angle G = 180$. Subtracting 90 from each side yields $m\angle E + m\angle G = 90$. $\angle E$ and $\angle G$ are complementary by definition.

Proportion (p. 417) A proportion is a statement that two ratios are equal. An *extended proportion* is a statement that three or more ratios are equal.

Proporción (p. 417) Una proporción es un enunciado en el cual dos razones son iguales. Una *proporción extendida* es un enunciado que dice que tres razones o más son iguales.

$\frac{6}{5} = \frac{3}{4}$ is a proportion.

$\frac{9}{27} = \frac{3}{9} = \frac{1}{3}$ is an extended proportion.

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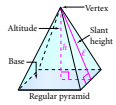
Pyramid (p. 537) A pyramid is a polyhedron in which one face, the *base,* is a polygon and the other faces, the *lateral faces,* are triangles with a common vertex, called the *vertex* of the pyramid. An *altitude* of a pyramid is the perpendicular segment from the *vertex* to the plane of the base. Its length is the *height* of the pyramid. A *regular pyramid* is a pyramid whose base is a regular polygon and whose lateral faces are congruent isosceles triangles. The *slant height* of a regular pyramid is the length of an altitude of a lateral face.

Pirámide (p. 537) Una pirámide es un poliedro en donde una cara, la *base,* es un polígono y las otras caras, las *caras laterales,* son triángulos con un vértice común, llamado el *vértice* de la pirámide. Una *altura* de una pirámide es el segmento perpendicular que va del *vértice* hasta el plano de la base. Su longitud es, por extensión, la *altura* de la pirámide. Una *pirámide regular* es una pirámide cuya base es un polígono regular y cuyas caras laterales son triángulos isósceles congruentes. *La altura de inclinación* de una pirámide regular es la longitud de la altura de la cara lateral.



Pythagorean triple (p. 357) A Pythagorean triple is a set of three nonzero whole numbers a, b, and c, that satisfy the equation $a^2 + b^2 = c^2$.

Triple de Pitágoras (p. 357) Un triple de Pitágoras es un conjunto de tres números enteros positivos a, b, and c que satisfacen la ecuación $a^2 + b^2 = c^2$.

The numbers 5, 12, and 13 form a Pythagorean triple because $5^2 + 12^2 = 13^2 = 169$.

Q

Quadrant (p. 43) *See* **coordinate plane.**

Cuadrante (p. 43) *Ver* **coordinate plane.**

Quadrilateral (p. 144) A quadrilateral is a polygon with four sides.

Cuadrilátero (p. 144) Un cuadrilátero es un polígono de cuatro lados.

R

Radius of a circle (p. 386) A radius of a circle is any segment with one endpoint on the circle and the other endpoint at the center of the circle. *Radius* can also mean the length of this segment.

Radio de un círculo (p. 386) Un radio de un círculo es cualquier segmento con un extremo en el círculo y el otro extremo en el centro del círculo. *Radio* también se refiere a la longitud de este segmento.

$\overline{DE}$ is a radius of $\odot D$.

EXAMPLES

Radius of a regular polygon (p. 380) The radius of a regular polygon is the distance from the center to a vertex.

Radio de un polígono regular (p. 380) El radio de un polígono regular es la distancia desde el centro hasta un vértice.

Radius of a sphere (p. 558) The radius of a sphere is a segment that has one endpoint at the center and the other endpoint on the sphere.

Radio de una esfera (p. 558) El radio de una esfera es un segmento con un extremo en el centro y otro en la superficie esférica.

Ratio (p. 416) A ratio is the comparison of two quantities by division.

Razón (p. 416) Una razón es la comparación de dos cantidades por medio de una división.

5 to 7

5 : 7

$\frac{5}{7}$

Ray (p. 17) A ray is the part of a line consisting of one *endpoint* and all the points of the line on one side of the endpoint.

Rayo (p. 17) Un rayo es una parte de una recta que contiene un *extremo* y todos los puntos de la recta a un lado del extremo.

Rectangle (p. 288) A rectangle is a parallelogram with four right angles.

Rectángulo (p. 288) Un rectángulo es un paralelogramo con cuatro ángulos rectos.

Reduction (p. 674) *See* **dilation.**

Reducción (p. 674) *Ver* **dilation.**

Reflection (p. 635) A reflection in (or *flip* across) line r is a transformation such that if a point A is on line r, then the image of A is itself, and if a point B is not on line r, then its image B' is the point such that r is the perpendicular bisector of $\overline{BB'}$.

Reflexión (p. 635) Una reflexión en la recta r es una transformación tal que si un punto A está en la recta r, entonces la imagen de A es ella misma, y si un punto B no está en la recta r, entonces su imagen B' es el punto tal que r es la mediatriz de $\overline{BB'}$.

Reflectional symmetry (p. 662) Reflectional symmetry, or *line symmetry,* is the type of symmetry for which there is a reflection that maps a figure onto itself. The reflection line is the line of symmetry.

Simetría por reflexión (p. 662) La simetría por reflexión, o simetría línea, es un tipo de simetría en la que la reflexión vuelve a trazar la figura sobre sí misma. La recta de reflexión es la recta de simetría.

A reflection in the given line maps the figure onto itself.

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EXAMPLES

Regular polygon (p. 146) A regular polygon is a polygon that is both equilateral and equiangular. Its *center* is the center of the circumscribed circle.

Polígono regular (p. 146) Un polígono regular es un polígono que es equilátero y equiángulo. Su *centro* es el centro del círculo circunscrito.

ABCDEF is a regular hexagon. Point X is its center.

Regular pyramid (p. 537) *See* **pyramid.**

Pirámide regular (p. 537) *Ver* **pyramid.**

Remote interior angles (p. 133) Remote interior angles are the two nonadjacent interior angles corresponding to each exterior angle of a triangle.

Ángulos interiores remotos (p. 133) Las ángulos interiores remotes son los dos angulos interiores no adyacentes que corresponden a cada ángulo exterior de un triángulo.

$\angle 1$ and $\angle 2$ are remote interior angles of $\angle 3$.

Resultant vector (p. 490) The sum of two vectors is a resultant.

Vector resultante (p. 490) La suma de dos vectores es el vector resultante.

$\vec{w}$ is the resultant of $\vec{u} + \vec{v}$.

Rhombus (p. 288) A rhombus is a parallelogram with four congruent sides.

Rombo (p. 288) Un rombo es un paralelogramo de cuatro lados congruentes.

Right angle (p. 28) A right angle is an angle whose measure is 90.

Ángulo recto (p. 28) Un ángulo recto es un ángulo que mide 90.

This symbol indicates a right angle.

Right cone (p. 539) *See* **cone.**

Cono recto (p. 539) *Ver* **cone.**

Right cylinder (p. 530) *See* **cylinder.**

Cilindro recto (p. 530) *Ver* **cylinder.**

Right prism (p. 528) *See* **prism.**

Prisma recto (p. 528) *Ver* **prism.**

EXAMPLES

Right triangle (pp. 133, 217) A right triangle contains one right angle. The side opposite the right angle is the *hypotenuse* and the other two sides are the *legs*.

Triángulo rectángulo (pp. 133, 217) Un triángulo rectángulo contiene un ángulo recto. El lado opuesto del ángulo recto es la *hipotenusa* y los otros dos lados son los *catetos*.

Rotation (p. 648) A rotation (*turn*) of $x°$ about a point R is a transformation such that for any point V, its image is the point V', where $RV = RV'$ and $m\angle VRV' = x$. The image of R is itself.

Rotación (p. 648) Una rotación de $x°$ alrededor de un punto R es una transformación de modo que para cualquier punto V, su imagen es el punto V', donde $RV = RV'$ y $m\angle VRV' = x$. La imagen de R es R misma.

Rotational symmetry (p. 663) Rotational symmetry is the type of symmetry for which there is a rotation of 180° or less that maps a figure onto itself.

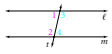
Simetría rotacional (p. 663) La simetría rotacional es un tipo de simetría en la que una rotación de 180° o menos vuelve a trazar una figura sobre sí misma.

The figure has 120° rotational symmetry.

S

Same-side interior angles (p. 115) Same side interior angles lie on the same side of the transversal t and between ℓ and m.

Ángulos internos del mismo lado (p. 115) Los ángulos internos del mismo lado están en el mismo lado de la transversal t y entre ℓ y m.



$\angle 1$ and $\angle 2$ are same-side interior angles, as are $\angle 3$ and $\angle 4$.

Scalar multiplication (p. 675) Scalar multiplication is the multiplication of each entry in a matrix by the same number, the *scalar*.

Multiplicación escalar (p. 675) La multiplicación escalar es cada elemento de una matriz la multiplicación de por el mismo número, el *escalar*.

$$2 \cdot \begin{bmatrix} 1 & 0 \\ -2 & 3 \end{bmatrix} = \begin{bmatrix} 2(1) & 2(0) \\ 2(-2) & 2(3) \end{bmatrix} = \begin{bmatrix} 2 & 0 \\ -4 & 6 \end{bmatrix}$$

Scale (p. 418) A scale is the ratio of any length in a scale drawing to the corresponding actual length. The lengths may be in different units.

Escala (p. 418) Una escala es la razón de cualquier longitud en un dibujo a escala en relación a la correspondiente longitud verdadera.

1 cm to 1 ft
1 cm = 1 ft
1 cm : 1 ft

EXAMPLES

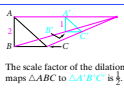
Scale drawing (p. 418) A scale drawing is a drawing in which all lengths are proportional to corresponding actual lengths.

Dibujo a escala (p. 418) Un dibujo a escala es un dibujo en el que todas las longitudes son proporcionales a las correspondientes longitudes verdaderas.

Scale: 1 in. = 30 ft

Scale factor (p. 674) The scale factor of a dilation is the number that describes the size change from an original figure to its image. *See also* **dilation.**

Factor de escala (p. 674) El factor de escala de una dilatación es el número que describe el cambio de tamaño de una figura original a su imagen. *Ver también* **dilation.**



The scale factor of the dilation that maps $\triangle ABC$ to $\triangle A'B'C'$ is $\frac{1}{2}$.

Scalene triangle (p. 133) A scalene triangle has no sides congruent.

Triángulo escaleno (p. 133) Un triángulo escaleno no tiene lados congruentes.

Secant (p. 607) A secant is a line, ray, or segment that intersects a circle at two points.

Secante (p. 607) Un secante es una recta, rayo o segmento que corta un círculo en dos puntos.

$\overline{AB}$ is a secant of $\odot C$.

Sector of a circle (p. 396) A sector of a circle is the region bounded by two radii and their intercepted arc.

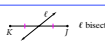
Sector de un círculo (p. 396) Un sector de un círculo es la región limitada por dos radios y el arco abarcado por ellos.

Segment (p. 17) A segment is the part of a line consisting of two points, called *endpoints*, and all points between them.

Segmento (p. 17) Un segmento es una parte de una recta que consiste en dos puntos, llamados *extremos*, y todos los puntos entre los extremos.

Segment bisector (p. 26) A segment bisector is a line, segment, ray, or plane that intersects a segment at its midpoint.

Bisectriz de un segmento (p. 26) La bisectriz de un segmento es una recta, segmento, rayo o plano que corta un segmento en su punto medio.



ℓ bisects $\overline{KJ}$.

EXAMPLES

Segment of a circle (p. 397) A segment of a circle is the part of a circle bounded by an arc and the segment joining its endpoints.

Segmento de un círculo (p. 397) Un segmento de un círculo es la parte de un círculo bordeada por un arco y el segmento que une sus extremos.

Semicircle (p. 387) A semicircle is half a circle.

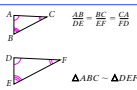
Semicírculo (p. 387) Un semicírculo es la mitad de un círculo.

Side *See* **angle; polygon.**

Lado *Ver* **angle; polygon.**

Similarity ratio (pp. 423, 566) The similarity ratio is the ratio of the lengths of corresponding sides of similar polygons.

Razón de semejanza (pp. 423, 566) La razón de semejanza es la razón de la longitud de los lados correspondientes de polígonos semejantes.



$\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

$\triangle ABC \sim \triangle DEF$

Similarity transformation (p. 674) *See* **dilation.**

Transformación de semejanza (p. 674) *Ver* **dilation.**

Similar polygons (p. 423) Similar polygons are polygons having corresponding angles congruent and corresponding sides proportional. You denote similarity by $\sim$.

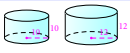
Polígonos semejantes (p. 423) Los polígonos semejantes son polígonos cuyos ángulos correspondientes son congruentes y los lados correspondientes son proporcionales. El símbolo $\sim$ significa "es semejante a".

$\triangle JKL \sim \triangle MNO$

Similarity ratio $= \frac{2}{5}$

Similar solids (p. 566) Similar solids have the same shape and have all their corresponding dimensions proportional.

Cuerpos geométricos semejantes (p. 566) Los cuerpos geométricos semejantes tienen la misma forma y todas sus dimensiones correspondientes son proporcionales.



Sine ratio (p. 477) *See* **trigonometric ratios.**

Razón seno (p. 477) *Ver* **trigonometric ratios.**

EXAMPLES

Skew lines (p. 18) Skew lines are lines that do not lie in the same plane.

Rectas cruzadas (p. 18) Las rectas cruzadas son rectas que no están en el mismo plano.

$\overline{AB}$ and $\overline{EF}$ are skew.

Slant height *See* **cone; pyramid.**

Altura de inclinación *Ver* **cone; pyramid.**

Slide (p. 641) *See* **translation.**

Slope-intercept form (p. 152) The slope-intercept form of a linear equation is $y = mx + b$, where m is the slope of the line and b is the y-intercept.

Fórmula pendiente-intercepto (p. 152) La fórmula pendiente-intercepto es la ecuación lineal $y = mx + b$, en la que m es la pendiente de la recta y b es el punto de intersección de esa recta con el eje y.

$y = \frac{1}{2}x - 3$

In this equation, the slope is $\frac{1}{2}$ and the y-intercept is -3.

Slope of a line (p. 151) The slope of a line is the ratio of its vertical change in the coordinate plane to the corresponding horizontal change. If (x_1, y_1) and (x_2, y_2) are points on a nonvertical line, then the slope is $\frac{y_2 - y_1}{x_2 - x_1}$. The slope of a horizontal line is 0 and the slope of a vertical line is undefined.

Pendiente de una recta (p. 151) La pendiente de una recta es la razón del cambio vertical en el plano de coordenadas en relación a al cambio horizontal correspondiente. Si (x_1, y_1) y (x_2, y_2) son puntos en una recta no vertical, entonces la pendiente es $\frac{y_2 - y_1}{x_2 - x_1}$. La pendiente de una recta horizontal es 0, y la pendiente de una recta vertical es indefinida.

The line containing $P(-1, -1)$ and $Q(1, -2)$ has slope $\frac{-2 - (-1)}{1 - (-1)} = \frac{-1}{2} = -\frac{1}{2}$.

Space (p. 11) Space is the set of all points.

Espacio (p. 11) El espacio es el conjunto de todos los puntos.

Sphere (p. 558) A sphere is the set of all points in space a given distance r, the *radius*, from a given point C, the *center*. A *great circle* is the intersection of a sphere with a plane containing the center of the sphere. The *circumference* of a sphere is the circumference of any great circle of the sphere.

Esfera (p. 558) Una esfera es el conjunto de los puntos del espacio que están a una distancia dada r, el *radio*, de un punto dado C, el *centro*. Un *círculo máximo* es la intersección de una esfera y un plano que contiene el centro de la esfera. La *circunferencia* de una esfera es la circunferencia de cualquier círculo máximo de la esfera.

EXAMPLES

Spherical geometry (p. 140) In spherical geometry, a plane is considered to be the surface of a sphere and a line is considered to be a great circle of the sphere. In spherical geometry, through a point not on a given line there is no line parallel to the given line.

Geometría esférica (p. 140) En la geometría esférica, un plano es la superficie de una esfera y una recta es un círculo máximo de la esfera. En la geometría esférica, a través de un punto que no está en una recta dada, no hay recta paralela a la recta dada.

In spherical geometry, lines are represented by great circles of a sphere.

Square (p. 288) A square is a parallelogram with four congruent sides and four right angles.

Cuadrado (p. 288) Un cuadrado es un paralelogramo con cuatro lados congruentes y cuatro ángulos rectos.

Standard form of a linear equation (p. 153) The standard form of a linear equation is $Ax + By = C$, where A, B, and C are integers and A and B are not both zero.

Fórmula normal de una ecuación lineal (p. 153) La fórmula normal de una ecuación lineal es $Ax + By = C$, donde A, B, y C son números reales, y donde A y B no son ambos iguales a cero.

$6x - y = 3$

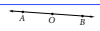
Standard form of an equation of a circle (p. 615) The standard form of an equation of a circle is $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) is the center of the circle.

Fórmula normal de la ecuación de un círculo (p. 615) La fórmula normal de la ecuación de un círculo es $(x - h)^2 + (y - k)^2 = r^2$, donde (h, k) son las coordenadas del centro del círculo.

In $(x + 5)^2 + (y + 2)^2 = 48$, $(-5, -2)$ is the center of the circle.

Straight angle (p. 28) A straight angle is an angle whose measure is 180.

Ángulo llano (p. 28) Un ángulo llano es un ángulo que mide 180.



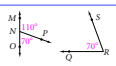
$m\angle AOB = 180$

Straightedge (p. 34) A straightedge is a ruler with no markings on it.

Regla sin graduación (p. 34) Una regla que sólo sirve para trazar rectas.

Supplementary angles (p. 96) Two angles are supplementary if the sum of their measures is 180.

Ángulos suplementarios (p. 96) Dos ángulos son suplementarios cuando sus medidas suman 180.



$\angle MNP$ and $\angle ONP$ are supplementary, as are $\angle MNP$ and $\angle QRS$.

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Surface area (pp. 529, 530, 538, 539, 558) The surface area of a prism, cylinder, pyramid, or cone is the sum of the lateral area and the areas of the bases. The surface area of a sphere is four times the area of a great circle. A list of surface area formulas is on p. 727.

Área (pp. 529, 530, 538, 539, 558) El área de un prisma, pirámide, cilindro o cono es la suma del área lateral y las áreas de las bases. El área de una esfera es igual a cuatro veces el área de un círculo máximo. Una lista de fórmulas de áreas está en la p. 727.

S.A. of prism = L.A. + 2B
= 66 + 2(28)
= 122 cm²

Symmetry (pp. 662, 663, 668) A figure has symmetry if there is an isometry that maps the figure onto itself. *See* **glide reflectional symmetry; point symmetry; reflectional symmetry; rotational symmetry; translational symmetry.**

Simetría (pp. 662, 663, 668) Una figura tiene simetría si hay una isometría que traza la figura sobre sí misma. *Ver* **glide reflectional symmetry; point symmetry; reflectional symmetry; rotational symmetry; translational symmetry.**

A regular pentagon has reflectional symmetry and 72° rotational symmetry.

Tangent ratio (p. 470) *See* **trigonometric ratios.**

Razón tangente (p. 470) *Ver* **trigonometric ratios.**

Tangent to a circle (p. 582) A tangent to a circle is a line, segment, or ray in the plane of the circle that intersects the circle in exactly one point. That point is the *point of tangency.*

Tangente de un círculo (p. 582) Un tangente de un círculo es una recta, segmento o rayo en el plano del círculo que corta el círculo en exactamente un punto. Ese punto es el *punto de tangencia.*

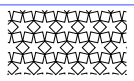
Line ℓ is tangent to $\odot C$. Point D is the point of tangency.

Terminal point of a vector (p. 490) *See* **vector.**

Punto terminal de un vector (p. 490) *Ver* **vector.**

Tessellation (p. 667) A tessellation, or *tiling,* is a repeating pattern of figures that completely covers a plane without gaps or overlap. A *pure tessellation* is a tessellation that consists of congruent copies of one figure.

Teselado (p. 667) Un teselado o *reticulado* es un patrón repetitivo de figuras que cubre completamente una superficie plana sin dejar espacios vacíos ni traslaparse. Un *teselado puro* consiste en copias congruentes de una figura.



EXAMPLES

Theorem (p. 98) A theorem is a conjecture that is proven.

Teorema (p. 98) Un teorema es una conjetura que se demuestra.

The theorem "Vertical angles are congruent" can be proven by using postulates, definitions, properties, and previously stated theorems.

Tiling (p. 667) *See* **tessellation.**

Reticulado (p. 667) *Ver* **tessellation.**

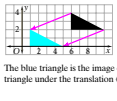
Transformation (p. 634) A transformation is a change in the position, size, or shape of a geometric figure. The given figure is called the *preimage* and the resulting figure is called the *image.* A transformation *maps* a figure onto its image. *Prime notation* is sometimes used to identify image points. In the diagram, X' (read "X prime") is the image of X.

Transformación (p. 634) Una transformación es un cambio en la posición, tamaño o forma de una figura. La figura dada se llama la *preimagen* y la figura resultante se llama la *imagen.* Una transformación *traza* la figura sobre su propia imagen. La *notación prima* a veces se utiliza para identificar los puntos de la imagen. En el diagrama de la derecha, X' (leído prima X) es la imagen de X.

$\triangle XYZ \rightarrow \triangle X'Y'Z'$

Translation (p. 641) A translation (*slide*)is a transformation that moves points the same distance and in the same direction. A translation in the coordinate plane is described by a vector.

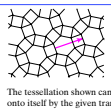
Traslación (p. 641) Una traslación es la transformación que mueve puntos a la misma distancia y en la misma dirección. Un vector puede describir la traslación en un plano de coordenadas.



The blue triangle is the image of the black triangle under the translation $\langle -5, -2 \rangle$.

Translational symmetry (p. 668) Translational symmetry is the type of symmetry for which there is a translation that maps a figure onto itself.

Simetría translacional (p. 668) La simetría translacional es un tipo de simetría en la que la translación vuelve a trazar la figura sobre sí misma.



The tessellation shown can be mapped onto itself by the given translation.

Transversal (p. 115) A transversal is a line that intersects two coplanar lines in two points.

Transversal (p. 115) Una transversal es una recta que corta dos rectas coplanares en dos puntos.

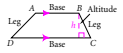
t is a transversal of ℓ and m.

English/Spanish Glossary

EXAMPLES

Trapezoid (pp. 288, 322) A trapezoid is a quadrilateral with exactly one pair of parallel sides, the *bases.* The nonparallel sides are called the *legs* of the trapezoid. Each pair of angles adjacent to a base are *base angles* of the trapezoid. An *altitude* of a trapezoid is a perpendicular segment from one base to the line containing the other base. Its length is called the *height* of the trapezoid.

Trapecio (pp. 288, 322) Un trapecio es un cuadrilátero con exactamente un par de lados paralelos, las *bases.* Los lados no paralelos se llaman los *catetos* del trapecio. Cada par de ángulos adyacentes a la base son *ángulos de base* del trapecio. Una *altura* del trapecio es un segmento perpendicular que va de una base a la recta que contiene la otra base. Su longitud se llama, por extensión, la *altura* del trapecio.



In trapezoid $ABCD$, $\angle ADC$ and $\angle BCD$ are one pair of base angles, and $\angle DAB$ and $\angle ABC$ are the other.

Triangle (p. 143) A triangle is a polygon with three sides. You can choose any side to be a *base.* The *height* is the length of the altitude drawn to the line containing that base.

Triángulo (p. 143) Un triángulo es un polígono con tres lados. Se puede escoger cualquier lado como *base.* La *altura,* entonces, es la longitud de la altura trazada hasta la recta que contiene la base.

Trigonometric ratios (pp. 470, 477) In right triangle $\triangle ABC$ with acute angle $\angle A$

sine $\angle A$ = sin A = $\frac{\text{leg opposite } \angle A}{\text{hypotenuse}}$

cosine $\angle A$ = cos A = $\frac{\text{leg adjacent to } \angle A}{\text{hypotenuse}}$

tangent $\angle A$ = tan A = $\frac{\text{leg opposite } \angle A}{\text{leg adjacent to } \angle A}$

Razones trigonométricas (pp. 468, 475) En un triángulo rectángulo $\triangle ABC$ con ángulo agudo $\angle A$

seno $\angle A$ = sen A = $\frac{\text{cateto opuesto a } \angle A}{\text{hipotenusa}}$

coseno $\angle A$ = cos A = $\frac{\text{cateto adyecente a } \angle A}{\text{hipotenusa}}$

tangente $\angle A$ = tan A = $\frac{\text{cateto opuesto a } \angle A}{\text{cateto adyecente a } \angle A}$

Truth value (p. 69) The truth value of a statement is "true" or "false" according to whether the statement is true or false, respectively.

Valor verdadero (p. 69) El valor verdadero de un enunciado es "verdadero" o "falso" según el enunciado sea verdadero o falso, respectivamente.

The truth value of the statement "If a figure is a triangle, then it has four sides" is *false.*

Turn (p. 648) *See* **rotation.**

EXAMPLES

Two-column proof (p. 117) *See* **proof.**

Prueba de dos columnas (p. 117) *Ver* **proof.**

Vector (p. 490) A vector is any quantity that has magnitude (size) and direction. You can represent a vector as an arrow that starts at one point, the *initial point*, and points to a second point, the *terminal point*. A vector can be described by *ordered pair notation* $\langle x, y \rangle$, where x represents horizontal change from the initial point to the terminal point and y represents vertical change from the initial point to the terminal point.

Vector ON has initial point O and terminal point N. The ordered pair notation for the vector is $\langle 5, 2 \rangle$.

Vector (p. 490) Un vector es cualquier cantidad que tiene magnitud (tamaño) y dirección. Se puede representar un vector como una flecha que empieza en un punto, el *punto inicial*, y se dirige a un segundo punto, el *punto terminal*. Un vector se puede describir mediante la *notación de pares ordenados* $\langle x, y \rangle$, donde x representa el cambio horizontal desde el punto inicial hasta el punto final, y y representa el cambio vertical desde el punto inicial hasta el punto final.

Vertex *See* **angle; cone; polygon; polyhedron; pyramid.** The plural form of *vertex* is *vertices*.

Vértice *Ver* **angle; cone; polygon; polyhedron; pyramid.**

Vertex angle (p. 211) *See* **isosceles triangle.**

Ángulo del vértice (p. 211) *Ver* **isosceles triangle.**

Vertical angles (p. 96) Vertical angles are two angles whose sides form two pairs of opposite rays.

$\angle 1$ and $\angle 2$ are vertical angles, as are $\angle 3$ and $\angle 4$.

Ángulos opuestos por el vértice (p. 96) Dos ángulos son ángulos opuestos por el vértice si sus lados son rayos opuestos.

Volume (p. 544) Volume is a measure of the space a figure occupies. A list of volume formulas is on p. 727.


The volume of this prism is 24 cubic units, or 24 units^3.

Volumen (p. 544) El volumen es una medida del espacio que ocupa una figura. Una lista de las fórmulas de volumen está en la p. 727.