Reasoning Magnitude of vector, 539 Mapping(s), 571 congruence, 572 composite or product of, 599-602 one-to-one, 571 similarity, 593, 644 Mathematical modeling, 1, 2, 27, 157 (Ex. 19), 224, 226, 258 (Exs. 16, 17), 298 (Ex. 22), 319 (Ex. 9), 332, 367-368, 374, 427 (Exs. 35, 36), 461-464, 481, 502 (Challenge), 504, 514, 515, 564, 581 (Exs. 24-29), 582-583, 598 See also Vectors Mathematicians Agnesi, 338 Archimedes, 451 Bolyai, 234 Cantor, 688 Cavalieri, 516 Ceva, 273 Euclid, 150 (Ex. 14), 233, 299 (Ex. 2) Euler, 332, 506, 676 Fibonacci, 261 Fuller, 505, 507 Gauss, 234 Hamilton, 678 Heron, 434 Hopper, 379 Koch, 686 Lobachevsky, 234, 304 Mandelbrot, 684, 686 Möbius, 66 Ptolemy, 356 Pythagoras, 290 Riemann, 234 Sharpe, 451 Steiner, 564 Vieta, 451 Wallis, 451 Mean(s) arithmetic, 290 geometric, 285-286, 397 of proportion, 245

tautology, 649

truth table, 644-647

See also Proof and

Venn diagrams, 208-209

Measure of angle, 17-18, 27 of arc, 339 Median of a trapezoid, 191 of a triangle, 152 Midpoint formula for, 47, 544, 717 of segment, 13, 43 Mirrors, 582, 614 Mixed Review Exercises, 37, 60, 82, 121, 151, 189, 212, 268, 294, 337, 357, 380, 391, 440, 487, 507, 543, 592 Möbius bands, 66 Model, 513

Negation, 645 Networks, 332, 681-683 n-gon, 101 Nine-Point Circle, 414-415, 670 Non-Euclidean Geometries, 233-234 Number line, 11-12

Octagon, 101 Octahedron, 506 One and only one, 23 Ordered pair, 113, 523 Ordered triple, 716 Orientation, 578 Origin, 113, 523, 716 Orthocenter, 387, 566, 561, 669

Pantograph, 265 (Ex. 9)

Paper folding, 710-715

Parallel, 73
Parallelogram(s), 167, 172
area of, 429
base and altitude, 424
properties of, 167–171
special, 184–185
Parallel Postulate, 233–234, 304
Parts, corresponding, 118
Patterns, recognizing, 22, 26, 106–109
Pentagon, 101
Perimeter, 249, 445, 503
of polygon, 445
ratio in similar figures, 249, 457

of regular polygon, 445

Perpendicular, 56 constructing a, 381 line to plane, 128 Perpendicular bisector, 153, 380 Pi (π) , 446, 451 Pie chart, 452 Plane(s), 5, 23 coordinate, 113, 523, 716 horizontal, 9 intersecting, 6, 23 parallel, 73-74 parrellel to line, 73 perpendicular bisecting, 155 (Ex. 11) vertical, 9 Point(s), 5, 23 collinear, 6 coordinate(s) of, 11, 27 coplanar, 6 distance between, 523-524 locating, 27-28 on number line, 11-12 in space, 565 of tangency, 329 Point-Slope Form, 553 Polygon(s), 101-103 angles of, 101-103 area of regular, 441 circle inscribed in, 334 circumscribed, 334 congruent, 118 convex, 101 diagonal of, 102 inscribed, 330 nonconvex, 105 (Ex. 27) perimeter of, 249 regular, 103 similar, 249, 264 sum of measures of angles, 102 vertex of, 101 See also Regular polygons Portfolio Projects, 702-709 Postulates, 12 See pp. 692-693 for list of postulates Preimage, 571 Prism(s), 475-477 inscribed, 494 lateral area, 476-477 oblique, 475, 516-517 parts of, 475 right, 475 total area, 476-477 volume, 476-477 Probability, geometric, 461