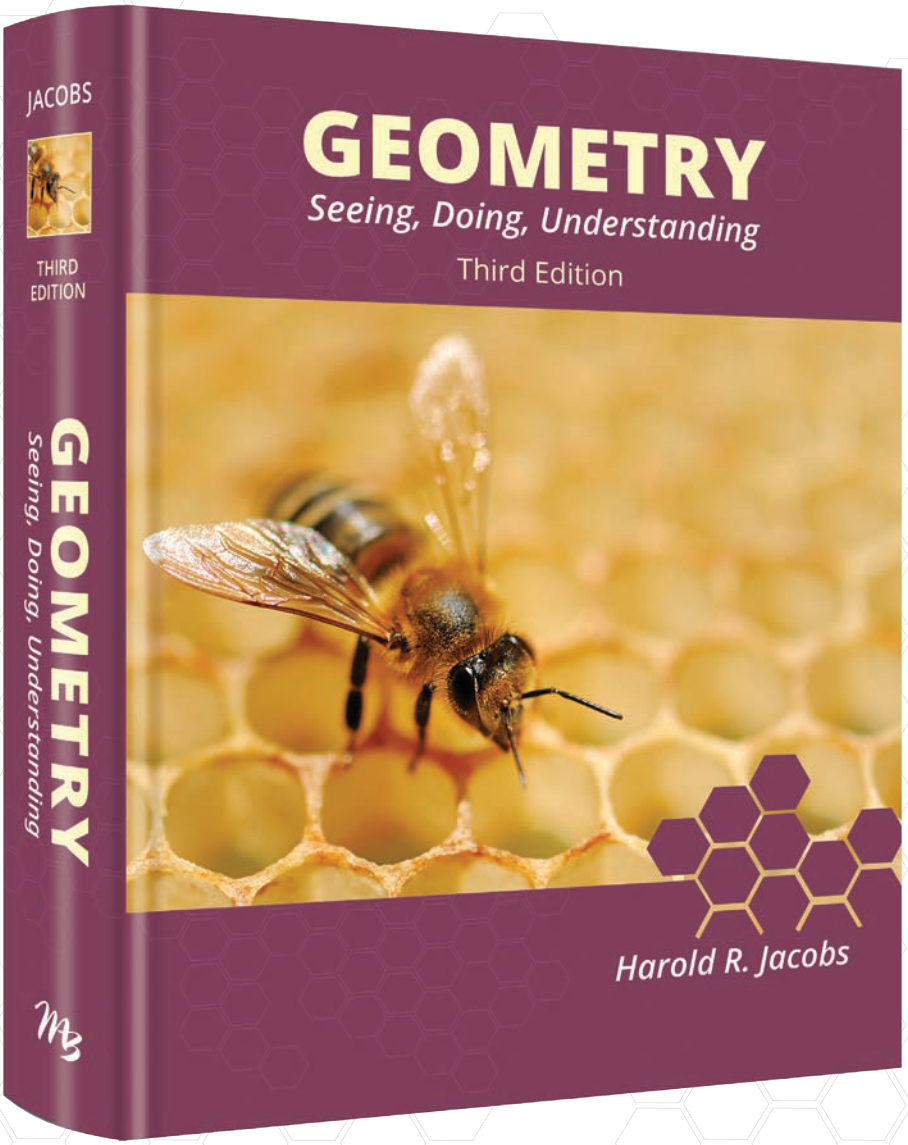
TEACHER GUIDE

High School | Geometry

- Weekly Lesson Schedule
- Chapter Tests, Mid-term Exam & Final Exam
- Test Answer Keys



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Geometry Seeing, Doing, Understanding

MASTER BOOKS CURRICULUM

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This book consists of chapter tests, a midyear examination, and a final examination that may be used with *Geometry: Seeing, Doing, Understanding*, Third Edition. The chapter test are designed for an examination period of approximately 45 minutes; the midyear and final are designed for an examination period of approximately 100 minutes. Complete answers for all the tests are in a separate section at the end of this book.

Author Bio:
HAROLD R. JACOBS is teacher of mathematics and science, writer, and well-respected speaker. He received his B.A. from U.C.L.A. and his M.A.L.S from Wesleyan University. His other publications include *Mathematics: A Human Endeavor*, *Elementary Algebra* and articles for *The Mathematics Teacher* and the *Encyclopedia Britannica*. Mr. Jacobs has received the Most Outstanding High School Mathematics Teacher in Los Angeles award, the Presidential Award for Excellence in Mathematics Teaching, and was featured in the book *101 Careers In Mathematics* published by the Mathematical Association of America.

Using This Teacher Guide

Features: The suggested weekly schedule enclosed has easy-to-manage lessons that guide the reading, course exercises, and all assessments. The pages of this guide are perforated and three-hole punched so materials are easy to tear out, hand out, grade, and store. Teachers are encouraged to adjust the schedule and materials needed in order to best work within their unique educational program.

Lesson Scheduling: Students are instructed to read the pages for each lesson in the student textbook and then complete the corresponding sets of exercises. Assessments include lesson exercises, chapter tests, a mid-term review, and final exam given at regular intervals with space to record each grade. Space is provided on the weekly schedule for assignment dates, and flexibility in scheduling is encouraged. Teachers may adapt the scheduled days per each unique student situation. As the student completes each assignment, this can be marked with an "X" in the box.

	**Approximately 60 to 75 minutes per lesson, five days a week**
	**Includes answer keys for chapter tests, mid-term and final exams**
	**The mid-term and final exam are included to help reinforce learning and provide assessment opportunities**
	**Designed for grades 9 to 12 in a one-year course to earn 1 math or Geometry credit**

Course Objectives:

- *Geometry: Seeing, Doing, Understanding* is designed to prepare students who already have a foundational understanding of Algebra to understand and illustrate the principles of Geometry. With the use of innovative discussions, cartoons, anecdotes, and vivid exercises, students will not only learn but will also find their interest growing with each lesson. The full-color student book focuses on guided discovery to help students develop geometric awareness. Geometry is all around us. Prepare to understand its dynamic influence so much better!

How To Use This Course:

- There is some flexibility in how the course is structured for the student, where the teacher can assign all of the suggested problems, or choose portions from each set if time is limited. Both the student textbook and the *Solutions Manual* are crucial in completing the course.

Course Description

Lessons are divided into 16 chapters, covering deductive reasoning, congruence and similarity, transformations, coordinate geometry, area, geometric solids and non-Euclidean geometries, with helpful summaries and reviews. As the student works through the textbook, selected answers to problems are available in the textbook, with full solutions to all of the exercises available in the *Solutions Manual* for the *Geometry: Seeing, Doing, Understanding* course.

Additional Materials Needed

- *Geometry: Seeing, Doing, Understanding* (student textbook).
- A notebook and graph paper are essential. It is highly recommended that students use a 3-ring binder, loose-leaf paper, and graph paper to complete the coursework. Tab dividers to separate your work by lesson are also recommended.

Reference Pages

These are included from the student text, and can be removed for ease of use by the students completing the course.

Testing

There are exams provided for each chapter in this *Teacher Guide*. Also included are a mid-term and a final exam. Answers for these are available in the back of this book.

Grading

It is always the prerogative of an educator/parent to assess student grades however he or she might deem best. The following is only a suggested guideline based on the material presented through this course:

- Each lesson's coursework is worth 100 points.
- All tests within the course are worth 100 points each.

To calculate the percentage of the worksheets, chapter tests, mid-term or final exam, the parent/educator may use the following guide.

Divide total number of questions correct (example: 43) by the total number of questions possible (example: 46) to calculate the percentage out of 100 possible. 43/46 = 93 percent correct. The suggested grade values are noted as follows:

90 to 100 percent = A
80 to 89 percent = B
70 to 79 percent = C
60 to 69 percent = D
0 to 59 percent = F

First Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
First Semester-First Quarter					
Week 1	Day 1	Read pages xi–2 of *Geometry* textbook (GEO) Complete the exercises on pages 2–5 • Read page 6 See this *Teacher Guide* (TG) for exams.			
	Day 2	Read Chapter 1: An Introduction to Geometry and Chapter 1, Lesson 1: Lines in Designing a City, pages 7–9 (GEO) Complete Exercise Sets I, II, and III, pages 10–12			
	Day 3	Read Chapter 1, Lesson 2: Angles in Measuring the Earth, pages 13–15 (GEO) Complete Exercise Sets I, II, and III, pages 15–17			
	Day 4	Read Chapter 1, Lesson 3: Polygons and Polyhedra: Pyramid Architecture, pages 18–20 (GEO) Complete Exercise Sets I, II, and III, pages 21–23			
	Day 5	Read Chapter 1, Lesson 4: Constructions: Telling Time with Shadows, pages 24–25 (GEO) Complete Exercise Sets I, II, and III, pages 26–29			
Week 2	Day 6	Read Chapter 1, Lesson 5: We Can't Go On Like This, pages 30–31 (GEO) Complete Exercise Sets I, II, and III, pages 31–34			
	Day 7	Read Chapter 1, Summary and Review, pages 35–36 (GEO) Complete Exercise Sets I, II, and III, pages 36–38			
	Day 8	Read Chapter 1, Algebra Review, page 39 Complete Exercises, page 40			
	Day 9	Chapter 1 Test Study Day			
	Day 10	**Chapter 1 Test,** pages 41–44 (TG)			
Week 3	Day 11	Review test and work for Chapter 1. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 12	Read Chapter 2, The Nature of Deductive Reasoning, and Lesson 1: Conditional Statements, pages 41–43 (GEO) Complete Exercise Sets I, II, and III, pages 43–45			
	Day 13	Read Chapter 2, Lesson 2: Definitions, pages 46–47 (GEO) Complete Exercise Sets I, II, and III, pages 47–49			
	Day 14	Read Chapter 2, Lesson 3: Direct Proof, pages 50–51 (GEO) Complete Exercise Sets I, II, and III, pages 52–54			
	Day 15	Read Chapter 2, Lesson 4: Indirect Proof, pages 55–57 (GEO) Complete Exercise Sets I, II, and III, pages 57–59			
Week 4	Day 16	Read Chapter 2, Lesson 5: A Deductive System, pages 60–61 (GEO) Complete Exercise Sets I, II, and III, pages 61–64			
	Day 17	Read Chapter 2, Lesson 6: Some Famous Theorems of Geometry, pages 65–67 (GEO) Complete Exercise Sets I, II, and III, pages 67–70			
	Day 18	Read Chapter 2, Summary and Review, page 71 (GEO) Complete Exercise Sets I and II, pages 71–74			
	Day 19	Read Chapter 2, Algebra Review, page 75 (GEO) Complete Exercises, page 76			
	Day 20	Chapter 2 Test Study Day			

Date	Day	Assignment	Due Date	✓	Grade
	Day 21	**Chapter 2 Test,** pages 45–48 (TG)			
	Day 22	Review test and work for Chapter 2. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Week 5	Day 23	Read Chapter 3, Lines and Angles and Lesson 1: Number Operations and Equality, pages 77–79 (GEO) Complete Exercise Sets I, II, and III, pages 80–83			
	Day 24	Read Chapter 3, Lesson 2: The Ruler and Distance, pages 84–86 (GEO) Complete Exercise Sets I, II, and III, pages 86–90			
	Day 25	Read Chapter 3, Lesson 3: The Protractor and Angle Measure, pages 91–93 (GEO) Complete Exercise Sets I, II, and III, pages 93–97			
	Day 26	Read Chapter 3, Lesson 4: Bisection, pages 98–100 (GEO) Complete Exercise Sets I, II, and III, pages 100–104			
	Day 27	Read Chapter 3, Lesson 5: Complementary and Supplementary Angles, pages 105–106 (GEO) Complete Exercise Sets I, II, and III, pages 107–109			
Week 6	Day 28	Read Chapter 3, Lesson 6: Linear Pairs and Vertical Angles, pages 110–112 (GEO) Complete Exercise Sets I, II, and III, pages 112–116			
	Day 29	Read Chapter 3, Lesson 7: Perpendicular and Parallel Lines, pages 117–118 (GEO) Complete Exercise Sets I, II, and III, pages 119–122			
	Day 30	Read Chapter 3, Summary and Review, page 123 (GEO) Complete Exercise Sets I and II, pages 124–128			
	Day 31	Read Chapter 3, Algebra Review, pages 129–130 (GEO) Complete Exercises, page 130			
	Day 32	Chapter 3 Test Study Day			
	Day 33	**Chapter 3 Test,** pages 49–52 (TG)			
Week 7	Day 34	Review test and work for Chapter 3. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 35	Read Chapter 4, Congruence and Lesson 1: Coordinates and Distance, pages 131–134 (GEO) Complete Exercise Sets I, II, and III, pages 134–138			
	Day 36	Read Chapter 4, Lesson 2: Polygons and Congruence, pages 139–141 (GEO) Complete Exercise Sets I, II, and III, pages 141–145			
	Day 37	Read Chapter 4, Lesson 3: ASA and SAS Congruence, pages 146–147 (GEO) Complete Exercise Sets I, II, and III, pages 148–150			
Week 8	Day 38	Read Chapter 4, Lesson 4: Congruence Proofs, pages 151–152 (GEO) Complete Exercise Sets I, II, and III, pages 153–156			
	Day 39	Read Chapter 4, Lesson 5: Isosceles and Equilateral Triangles, pages 157–159 (GEO) Complete Exercise Sets I, II, and III, pages 159–162			
	Day 40	Read Chapter 4, Lesson 6: SSS Congruence, pages 163–164 (GEO) Complete Exercise Sets I, II, and III, pages 165–168			

Date	Day	Assignment	Due Date	✓	Grade
Week 9	Day 41	Read Chapter 4, Lesson 7: Constructions, pages 169–171 (GEO) Complete Exercise Sets I, II, and III, pages 172–175			
	Day 42	Read Chapter 4, Summary and Review, page 176 (GEO) Complete Exercise Sets I and II, pages 176–180			
	Day 43	Read Chapter 4, Algebra Review, pages 181–182 (GEO) Complete Exercises, page 182			
	Day 44	Chapter 4 Test Study Day			
	Day 45	**Chapter 4 Test,** pages 53–56 (TG)			
First Semester-Second Quarter					
Week 1	Day 46	Review test and work for Chapter 4. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 47	Read Chapter 5, Inequalities and Lesson 1: Properties of Inequality, pages 183–186 (GEO) Complete Exercise Sets I, II, and III, pages 186–189			
	Day 48	Read Chapter 5, Lesson 2: The Exterior Angle Theorem, pages 190–191 (GEO) Complete Exercise Sets I, II, and III, pages 192–194			
	Day 49	Read Chapter 5, Lesson 3: Triangle Side and Angle Inequalities, pages 195–196 (GEO) Complete Exercise Sets I, II, and III, pages 197–199			
	Day 50	Read Chapter 5, Lesson 4: The Triangle Inequality Theorem, pages 200–201 (GEO) Complete Exercise Sets I, II, and III, pages 202–205			
Week 2	Day 51	Read Chapter 5, Summary and Review, page 206 Complete Exercise Sets I and II, pages 206–209			
	Day 52	Read Chapter 5, Algebra Review, page 210 Complete Exercises, page 210			
	Day 53	Chapter 5 Test Study Day			
	Day 54	**Chapter 5 Test,** pages 57–60 (TG)			
	Day 55	Review test and work for Chapter 5. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Week 3	Day 56	Read Chapter 6, Parallel Lines and Lesson 1: Line Symmetry, pages 211–213 (GEO) Complete Exercise Sets I, II, and III, pages 214–218			
	Day 57	Read Chapter 6, Lesson 2: Proving Lines Parallel, pages 219–220 (GEO) Complete Exercise Sets I, II, and III, pages 221–224			
	Day 58	Read Chapter 6, Lesson 3: The Parallel Postulate, pages 225–226 (GEO) Complete Exercise Sets I, II, and III, pages 226–229			
	Day 59	Read Chapter 6, Lesson 4: Parallel Lines and Angles, pages 230–231 (GEO) Complete Exercise Sets I, II, and III, pages 232–235			
	Day 60	Read Chapter 6, Lesson 5: The Angles of a Triangle, pages 236–237 (GEO) Complete Exercise Sets I, II, and III, pages 238–241			

Date	Day	Assignment	Due Date	✓	Grade
Week 4	Day 61	Read Chapter 6, Lesson 6: AAS and HL Congruence, pages 242–244 (GEO) Complete Exercise Sets I, II, and III, pages 245–248			
	Day 62	Read Chapter 6, Summary and Review, page 249 (GEO) Complete Exercise Sets I and II, pages 250–254			
	Day 63	Read Chapter 6, Algebra Review, pages 255–256 (GEO) Complete Exercises, page 256			
	Day 64	Chapter 6 Test Study Day			
	Day 65	**Chapter 6 Test**, pages 61–64 (TG)			
Week 5	Day 66	Review test and work for Chapter 6. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 67	Read Chapter 7, Quadrilaterals and Lesson 1: Quadrilaterals, pages 257–259 (GEO) Complete Exercise Sets I, II, and III, pages 260–264			
	Day 68	Read Chapter 7, Lesson 2: Parallelograms and Point Symmetry, pages 265–266 (GEO) Complete Exercise Sets I, II, and III, pages 267–269			
	Day 69	Read Chapter 7, Lesson 3: More on Parallelograms, pages 270–271 (GEO) Complete Exercise Sets I, II, and III, pages 272–275			
	Day 70	Read Chapter 7, Lesson 4: Rectangles, Rhombuses, and Squares, pages 276–277 Complete Exercise Sets I, II, and III, pages 277–280			
Week 6	Day 71	Read Chapter 7, Lesson 5: Trapezoids, pages 281–282 (GEO) Complete Exercise Sets I, II, and III, pages 282–285			
	Day 72	Read Chapter 7, Lesson 6: The Midsegment Theorem, pages 286–287 (GEO) Complete Exercise Sets I, II, and III, pages 288–291			
	Day 73	Read Chapter 7, Summary and Review, page 292 (GEO) Complete Exercise Sets I and II, pages 292–295			
	Day 74	Read Chapter 7, Algebra Review, page 296 (GEO) Complete Exercises, page 296			
	Day 75	Chapter 7 Test Study Day			
Week 7	Day 76	**Chapter 7 Test,** pages 65–68 (TG)			
	Day 77	Review test and work for Chapter 7. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 78	Read Chapter 8, Transformations and Lesson 1: Transformations, pages 297–300 (GEO) Complete Exercise Sets I, II, and III, pages 300–304			
	Day 79	Read Chapter 8, Lesson 2: Reflections, pages 305–307 (GEO) Complete Exercise Sets I, II, and III, pages 308–311			
	Day 80	Read Chapter 8, Lesson 3: Isometries and Congruence, pages 312–313 (GEO) Complete Exercise Sets I, II, and III, pages 314–318			

Date	Day	Assignment	Due Date	✓	Grade
Week 8	Day 81	Read Chapter 8, Lesson 4: Transformations and Symmetry, pages 319–320 (GEO) Complete Exercise Sets I, II, and III, pages 321–324			
	Day 82	Read Chapter 8, Summary and Review, page 325 (GEO) Complete Exercise Sets I and II, pages 325–329			
	Day 83	Chapter 8 Test Study Day			
	Day 84	**Chapter 8 Test,** pages 69–72 (TG)			
	Day 85	Review test and work for Chapter 8. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Week 9	Day 86	Complete Midterm Review Set I, pages 330–333 (GEO)			
	Day 87	Complete Midterm Review Set II, pages 333–336 (GEO)			
	Day 88	Midterm Test Study Day			
	Day 89	**Chapter 1–8 Midterm Test Day 1,** pages 107–109 (TG)			
	Day 90	**Chapter 1–8 Midterm Test Day 2,** pages 111–114 (TG)			
		Midterm Grade			

Second Semester Suggested Daily Schedule

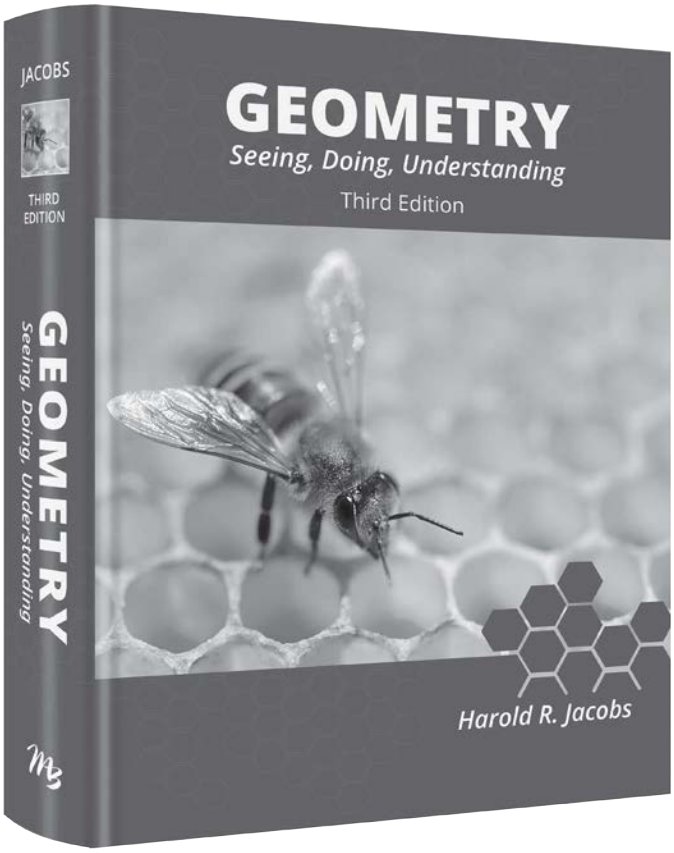
Date	Day	Assignment	Due Date	✓	Grade
		Second Semester-Third Quarter			
Week 1	Day 91	Read Chapter 9, Area and Lesson 1: Area, pages 337–339 (GEO) Complete Exercise Sets I, II, and III, pages 340–343			
	Day 92	Read Chapter 9, Lesson 2: Squares and Rectangles, pages 344–345 (GEO) Complete Exercise Sets I, II, and III, pages 345–350			
	Day 93	Read Chapter 9, Lesson 3: Triangles, pages 351–353 (GEO) Complete Exercise Sets I, II, and III, pages 353–357			
	Day 94	Read Chapter 9, Lesson 4: Parallelograms and Trapezoids, pages 358–359 (GEO) Complete Exercise Sets I, II, and III, pages 360–364			
	Day 95	Read Chapter 9, Lesson 5: The Pythagorean Theorem, pages 365–366 (GEO) Complete Exercise Sets I, II, and III, pages 367–370			
Week 2	Day 96	Read Chapter 9, Summary and Review, page 371 (GEO) Complete Exercise Sets I and II, pages 371–375			
	Day 97	Read Chapter 9, Algebra Review, page 376 (GEO) Complete Exercises, page 376			
	Day 98	Chapter 9 Test Study Day			
	Day 99	**Chapter 9 Test,** pages 73–76 (TG)			
	Day 100	Review test and work for Chapter 9. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			

Date	Day	Assignment	Due Date	✓	Grade
Week 3	Day 101	Read Chapter 10, Similarity and Lesson 1: Ratio and Proportion, pages 377–380 (GEO) Complete Exercise Sets I, II, and III, pages 380–384			
	Day 102	Read Chapter 10, Lesson 2: Similar Figures, pages 385–387 (GEO) Complete Exercise Sets I, II, and III, pages 387–391			
	Day 103	Read Chapter 10, Lesson 3: The Side-Splitter Theorem, pages 392–394 (GEO) Complete Exercise Sets I, II, and III, pages 394–398			
	Day 104	Read Chapter 10, Lesson 4: The AA Similarity Theorem, pages 399–401 (GEO) Complete Exercise Sets I, II, and III, pages 401–406			
	Day 105	Read Chapter 10, Lesson 5: Proportions and Dilations, pages 407–408 (GEO) Complete Exercise Sets I, II, and III, pages 409–413			
Week 4	Day 106	Read Chapter 10, Lesson 6: Perimeters and Areas of Similar Figures, pages 414–416 (GEO) Complete Exercise Sets I, II, and III, pages 416–419			
	Day 107	Read Chapter 10, Summary and Review, page 420 (GEO) Complete Exercise Sets I and II, pages 421–424			
	Day 108	Read Chapter 10, Algebra Review, page 425 (GEO) Complete Exercises, page 425			
	Day 109	Read Chapter 10, Algebra Review, page 426 (GEO) Complete Exercises, page 426			
	Day 110	Chapter 10 Test Study Day			
Week 5	Day 111	**Chapter 10 Test,** pages 77–80 (TG)			
	Day 112	Review test and work for Chapter 10. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 113	Read Chapter 11, The Right Triangle and Lesson 1: Proportions in a Right Triangle, pages 427–429 (GEO) Complete Exercise Sets I, II, and III, pages 430–433			
	Day 114	Read Chapter 11, Lesson 2: The Pythagorean Theorem Revisited, pages 434–435 (GEO) Complete Exercise Sets I, II, and III, pages 436–440			
	Day 115	Read Chapter 11, Lesson 3: Isosceles and 30°-60° Right Triangles, pages 441–443 (GEO) Complete Exercise Sets I, II, and III, pages 443–447			
Week 6	Day 116	Read Chapter 11, Lesson 4: The Tangent Ratio, pages 448–449 (GEO) Complete Exercise Sets I, II, and III, pages 450–453			
	Day 117	Read Chapter 11, Lesson 5: The Sine and Cosine Ratios, pages 454–455 (GEO) Complete Exercise Sets I, II, and III, pages 456–460			
	Day 118	Read Chapter 11, Lesson 6: Slope, pages 461–463 (GEO) Complete Exercise Sets I, II, and III, pages 463–467			
	Day 119	Read Chapter 11, Lesson 7: The Laws of Sines and Cosines, pages 468–470 (GEO) Complete Exercise Sets I, II, and III, pages 471–474			
	Day 120	Read Chapter 11, Summary and Review, page 475 (GEO) Complete Exercise Sets I and II, pages 476–480			

Date	Day	Assignment	Due Date	✓	Grade
Week 7	Day 121	Read Chapter 11, Algebra Review, pages 481–482 (GEO) Complete Exercises, page 482			
	Day 122	Chapter 11 Test Study Day			
	Day 123	**Chapter 11 Test,** pages 81–84 (TG)			
	Day 124	Review test and work for Chapter 11. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 125	Read Chapter 12, Circles and Lesson 1: Circles, Radii, and Chords, pages 483–485 (GEO) Complete Exercise Sets I, II, and III, pages 486–490			
Week 8	Day 126	Read Chapter 12, Lesson 2: Tangents, pages 491–492 (GEO) Complete Exercise Sets I, II, and III, pages 493–496			
	Day 127	Read Chapter 12, Lesson 3: Central Angles and Arcs, pages 497–499 (GEO) Complete Exercise Sets I, II, and III, pages 500–503			
	Day 128	Read Chapter 12, Lesson 4: Inscribed Angles, pages 504–505 (GEO) Complete Exercise Sets I, II, and III, pages 506–509			
	Day 129	Read Chapter 12, Lesson 5: Secant Angles, pages 510–511 (GEO) Complete Exercise Sets I, II, and III, pages 512–515			
	Day 130	Read Chapter 12, Lesson 6: Tangent Segments and Intersecting Chords, pages 516–517 (GEO) Complete Exercise Sets I, II, and III, pages 517–521			
Week 9	Day 131	Read Chapter 12, Summary and Review, page 522 (GEO) Complete Exercise Sets I and II, pages 523–526			
	Day 132	Read Chapter 12, Algebra Review, pages 527–528 (GEO) Complete Exercises, page 528			
	Day 133	Chapter 12 Test Study Day			
	Day 134	**Chapter 12 Test,** pages 85–88 (TG)			
	Day 135	Review test and work for Chapter 12. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Second Semester-Fourth Quarter					
Week 1	Day 136	Read Chapter 13, The Concurrence Theorems and Lesson 1: Triangles and Circles, pages 529–531 (GEO) Complete Exercise Sets I, II, and III, pages 532–535			
	Day 137	Read Chapter 13, Lesson 2: Cyclic Quadrilaterals, pages 536–537 (GEO) Complete Exercise Sets I, II, and III, pages 538–541			
	Day 138	Read Chapter 13, Lesson 3: Incircles, pages 542–543 (GEO) Complete Exercise Sets I, II, and III, pages 544–547			
	Day 139	Read Chapter 13, Lesson 4: The Centroid of a Triangle, pages 548–549 (GEO) Complete Exercise Sets I, II, and III, pages 550–553			
	Day 140	Read Chapter 13, Lesson 5: Ceva's Theorem, pages 554–556 (GEO) Complete Exercise Sets I, II, and III, pages 557–560			

Date	Day	Assignment	Due Date	✓	Grade
Week 2	Day 141	Read Chapter 13, Lesson 6: Napoleon's Discovery and Other Surprises, pages 561–562 (GEO) Complete Exercise Sets I, II, and III, pages 562–565			
	Day 142	Read Chapter 13, Summary and Review, page 566 (GEO) Complete Exercise Sets I and II, pages 566–570			
	Day 143	Chapter 13 Test Study Day			
	Day 144	**Chapter 13 Test,** pages 89–92 (TG)			
	Day 145	Review test and work for Chapter 13. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Week 3	Day 146	Read Chapter 14, Regular Polygons and the Circle and Lesson 1: Regular Polygons, pages 571–574 (GEO) Complete Exercise Sets I, II, and III, pages 574–578			
	Day 147	Read Chapter 14, Lesson 2: The Perimeter of a Regular Polygon, pages 579–581 (GEO) Complete Exercise Sets I, II, and III, pages 581–584			
	Day 148	Read Chapter 14, Lesson 3: The Area of a Regular Polygon, pages 585–587 (GEO) Complete Exercise Sets I, II, and III, pages 587–590			
	Day 149	Read Chapter 14, Lesson 4: From Polygons to Pi, pages 591–593 (GEO) Complete Exercise Sets I, II, and III, pages 593–597			
	Day 150	Read Chapter 14, Lesson 5: The Area of a Circle, pages 598–599 (GEO) Complete Exercise Sets I, II, and III, pages 600–604			
Week 4	Day 151	Read Chapter 14, Lesson 6: Sectors and Arcs, pages 605–606 (GEO) Complete Exercise Sets I, II, and III, pages 606–611			
	Day 152	Read Chapter 14, Summary and Review, page 612 (GEO) Complete Exercise Sets I and II, pages 612–616			
	Day 153	Chapter 14 Test Study Day			
	Day 154	**Chapter 14 Test,** pages 93–96 (TG)			
	Day 155	Review test and work for Chapter 14. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
Week 5	Day 156	Read Chapter 15, Geometric Solids and Lesson 1: Lines and Planes in Space, pages 617–620 (GEO) Complete Exercise Sets I, II, and III, pages 620–625			
	Day 157	Read Chapter 15, Solid Geometry as a Deductive System, pages 626–627 (GEO)			
	Day 158	Read Chapter 15, Lesson 2: Rectangular Solids, pages 628–629 (GEO) Complete Exercise Sets I, II, and III, pages 630–633			
	Day 159	Read Chapter 15, Lesson 3: Prisms, pages 634–635 (GEO) Complete Exercise Sets I, II, and III, pages 635–639			
	Day 160	Read Chapter 15, Lesson 4: The Volume of a Prism, pages 640–642 (GEO) Complete Exercise Sets I, II, and III, pages 642–646			

Date	Day	Assignment	Due Date	✓	Grade
Week 6	Day 161	Read Chapter 15, Lesson 5: Pyramids, pages 647–648 (GEO) Complete Exercise Sets I, II, and III, pages 649–653			
	Day 162	Read Chapter 15, Lesson 6: Cylinders and Cones, pages 654–656 (GEO) Complete Exercise Sets I, II, and III, pages 656–661			
	Day 163	Read Chapter 15, Lesson 7: Spheres, pages 662–665 (GEO) Complete Exercise Sets I, II, and III, pages 665–669			
	Day 164	Read Chapter 15, Lesson 8: Similar Solids, pages 670–672 (GEO) Complete Exercise Sets I, II, and III, pages 672–676			
	Day 165	Read Chapter 15, Lesson 9: The Regular Polyhedra, pages 677–678 (GEO) Complete Exercise Sets I, II, and III, pages 678–682			
Week 7	Day 166	Read Chapter 15, Summary and Review, page 683 (GEO) Complete Exercise Sets I and II, pages 684–688			
	Day 167	Chapter 15 Test Study Day			
	Day 168	**Chapter 15 Test,** pages 97–99 (TG)			
	Day 169	Review test and work for Chapter 15. Use this time to build your skills or work on concepts that you may be struggling to understand or master.			
	Day 170	Read Chapter 16, Non-Euclidean Geometries and Lesson 1: Geometry on a Sphere, pages 689–691 (GEO) Complete Exercise Sets I, II, and III, pages 692–695			
Week 8	Day 171	Read Chapter 16, Lesson 2: The Saccheri Quadrilateral, pages 696–698 (GEO) Complete Exercise Sets I, II, and III, pages 698–701			
	Day 172	Read Chapter 16, Lesson 3: The Geometries of Lobachevsky and Riemann, pages 702–703 (GEO) Complete Exercise Sets I, II, and III, pages 704–706			
	Day 173	Read Chapter 16, Lesson 4: The Triangle Angle Sum Theorem Revisited, pages 707–708 (GEO) Complete Exercise Sets I, II, and III, pages 709–712			
	Day 174	Read Chapter 16, Summary and Review, page 713 (GEO) Complete Exercise Sets I and II, pages 714–717			
	Day 175	Chapter 16 Test Study Day			
Week 9	Day 176	**Chapter 16 Test Day,** pages 101–104 (TG)			
	Day 177	Complete Final Review Set I, pages 718–722			
	Day 178	Complete Final Review Set II, pages 723–727			
	Day 179	**Final Test Day 1,** pages 115–120 (TG)			
	Day 180	**Final Test Day 2,** pages 121–126 (TG)			
		Final Grade			



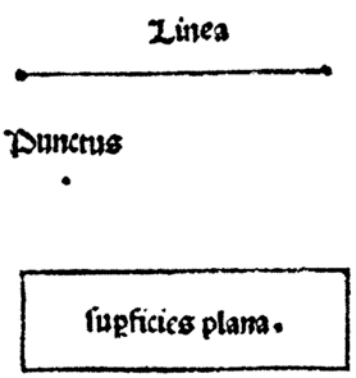
Chapter Tests and Test Answer Sheets

for Use with

Geometry: Seeing, Doing, Understanding

Note: This section of the teacher guide contains chapter tests and answer sheets. Special thanks to Donald M. Luepke for his contributions to the tests.

These figures appeared in the first printed version of the *Elements*.



1. Who wrote the *Elements*?
2. What does the figure labeled "punctus" represent?

The figure labeled "linea" looks like a line segment.

3. What is the difference between a *line* and a *line segment*?

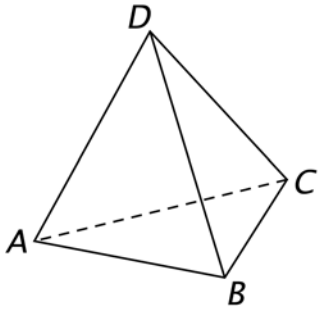
The figure labeled "supficies plana" looks like a rectangle.

4. What is the difference between a *rectangle* and a *plane*?

A *quadruped* is an animal with four legs.

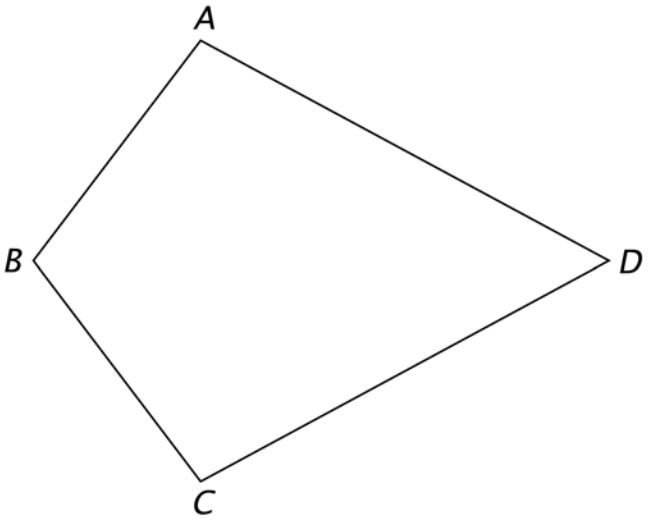
5. What is a *quadrilateral*?
6. Explain how the word *pentagon* would help someone figure out how many athletic events are in the *pentathlon*.
7. What do an *octopus* and an *octagon* have in common?

The figure below is a transparent view of a tetrahedron, a polyhedron that has four faces.



8. What kind of polygon are its faces?
9. How many edges meet at each corner of a tetrahedron?
10. Any three corners of a tetrahedron are noncollinear. What is another word that describes them?

Because of its shape, this quadrilateral is called a "kite."

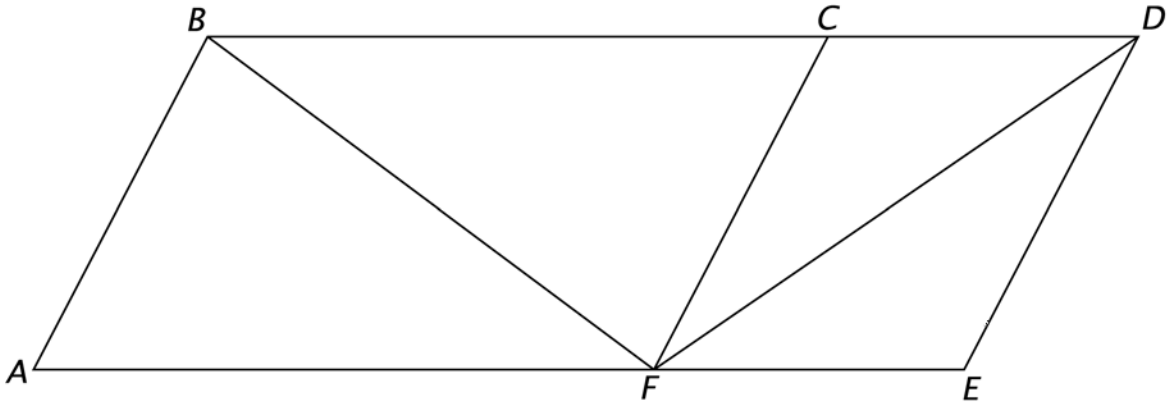


11. Use your straightedge and compass to bisect ∠A, ∠B, and ∠C. Extend the three lines across the figure.
12. What relation do the three lines appear to have to each other?
13. What relation does the line that bisects ∠B appear to have to ∠D?

The floors of two rooms are rectangular in shape. Their dimensions are as follows.

Room A: 15 feet wide, 18 feet long.
Room B: 10 feet wide, 24 feet long.

14. Which room has the greater perimeter? Explain.
15. Which room has the greater area? Explain.



The figure above contains an optical illusion.

Use your ruler to measure the following segments, each to the nearest 0.1 cm.

16. FB.
17. FD.

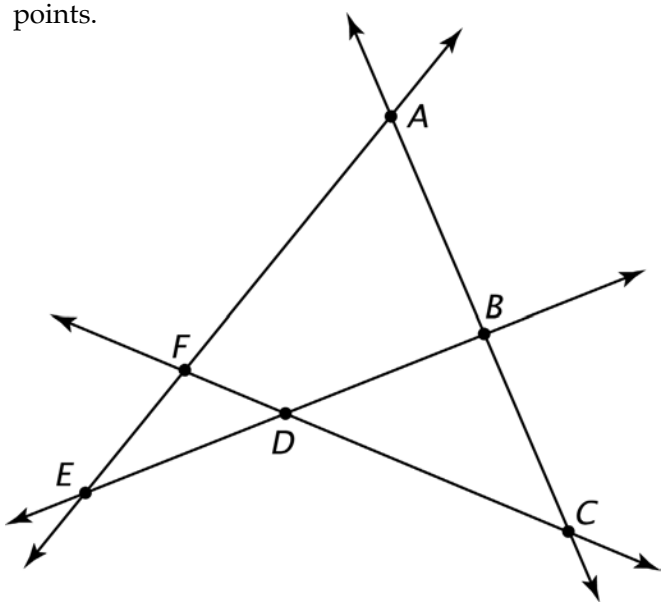
Use your protractor to measure each of the following angles. (You may extend the sides of the angles as necessary.)

18. ∠A.
19. ∠BFD.

Your measurements reveal something surprising about the figure.

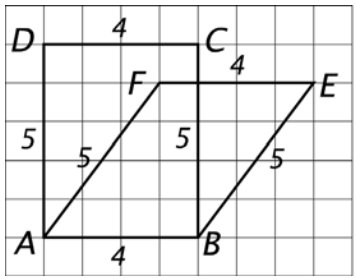
20. What is it?

This figure shows four lines that intersect in six points.



21. Draw AD, BF, and CE. Use your straightedge and compass to bisect these three line segments. Use the letter M to label the midpoint of AD, the letter N for the midpoint of BF, and the letter O for the midpoint of CE.
22. What seems to be true about points M, N, and O?

The figure below shows two quadrilaterals, ABCD and ABEF, drawn on the same grid; AB = DC = FE = 4 and AD = AF = BC = BE = 5.



To find the area of a quadrilateral, the Egyptians used the formula

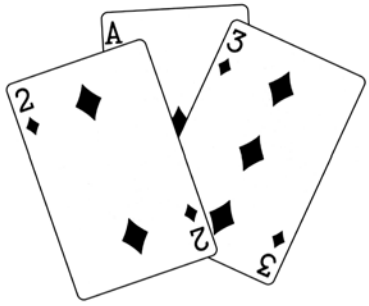
$$A = \frac{1}{4}(a + c)(b + d)$$

in which a, b, c, and d are the lengths of the consecutive sides.

23. Use the figure to show that the Egyptian formula does not always work correctly.

Extra Credit.

A magician takes the three cards shown below from an ordinary deck (containing clubs, ♣, diamonds, ♦, hearts, ♥, and spades, ♠).



1. What cards do you think they are?
2. Can you explain how someone might be tricked with them?

Geometry	Test 1	Scope: Chapters 1	Total score: ____of 100	Name

1. _____

2. _____

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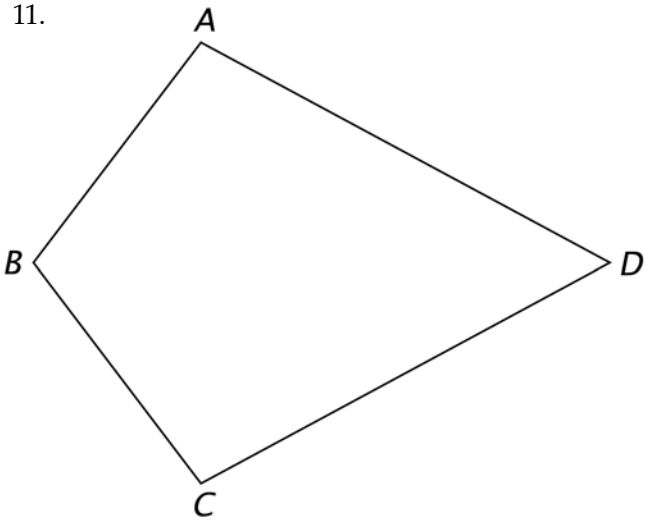
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16. _____

17. _____

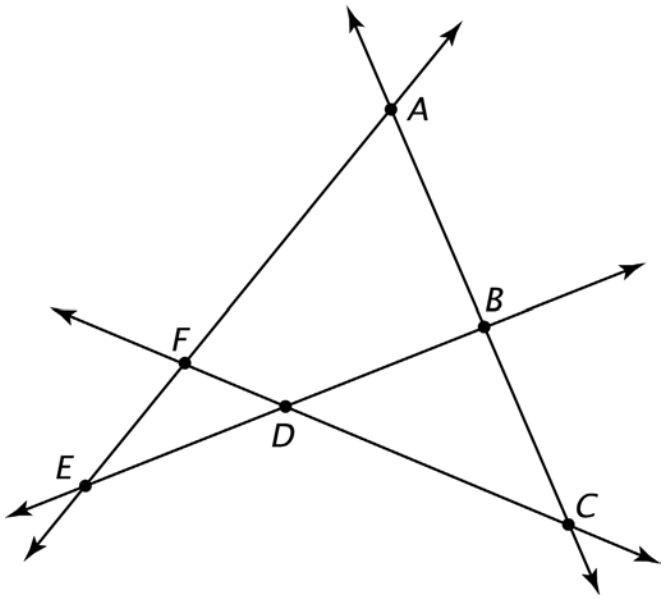
18. _____

19. _____

20. _____

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21.



22. _____

23. _____

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Extra Credit

1. _____

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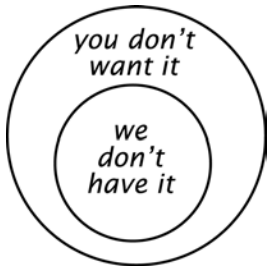
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2. _____

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1. Name the property or definition illustrated by each of the following equations.
   a) $2(3x) = (2\cdot3)x$
   b) $4 + y = y + 4$
2. Write each of the following expressions as a single integer.
   a) $(13 - 5)^2$
   b) $13^2 - 5^2$
3. Simplify the following expressions.
   a) $5x^2 - x^2$
   b) $(6x - y) - (x - 7y)$
4. Read the following statements carefully and mark them true or false.
   a) If a conditional statement is true, its converse must also be true.
   b) If the radius of a circle is r, its area is πr^2.
   c) It is possible to define every word in terms of simpler words.
   d) To prove $a \rightarrow b$ indirectly, you begin by assuming *not a*.
   e) A syllogism consists of two premises and a conclusion.
5. This figure illustrates a claim that appeared in a newspaper ad.



   a) What is this type of figure called?
   b) Write the statement in "if *a*, then *b*" form.
   c) Rewrite it in the form "*b* if *a*."
   d) Which of the following statements is also illustrated by the diagram?
      (1) If you don't want it, we don't have it.
      (2) If you want it, we have it.
      (3) If we have it, you want it.
6. Consider the following premises:

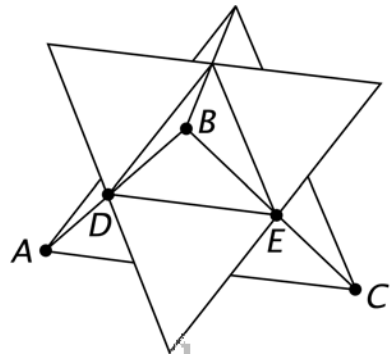
   If you watch Sesame Street, you are a kid at heart.

   If you are a kid at heart, you love Eskimo pies.
   a) What conclusion follows from these premises?
   b) If one of the premises is false, does it follow that the conclusion must be false?
   c) If both premises are true, does it follow that the conclusion must be true?
7. The following statement is a whimsical definition of *egotist:*

   You are an egotist if you are always me-deep in conversation.
   a) What does the abbreviation "iff" stand for?
   b) Write the two conditional statements that are equivalent to the definition.
   c) How is one of your statements related to the other?
8. The following sentence, from a Spanish geometry book, describes geometry as a deductive system:

   Euclides construye la Geometría partiendo de definiciónes, postulados y axiomas con los cuales demuestra teoremas.

   Write the English equivalent of each of the following words *and* tell what the word means.
   a) definición.
   b) postulado.
   c) teorema.
   d) Tell what you think the sentence says.
9. In this figure of a polyhedron, ABC is a triangle.



   Tell whether each of the following statements is true or false.
   a) Points A, D, and B are collinear.
   b) Points A and D determine a line.
   c) Points B, E, and C are coplanar.
   d) Points B, E, and C determine a plane.
   e) Points A, D, and C determine a plane.

10. After studying the relations of the statements given in the following proof, write the missing statements.

Theorem.

If there is a total eclipse of the sun, the temperature can be determined without a thermometer.

Proof.

If there is a total eclipse of the sun, the sky becomes dark.

a) (What is the second statement?)

If the crickets think that it is night, they will start chirping.

b) (What is the fourth statement?)

If the temperature is estimated by counting cricket chirps, it can be determined without a thermometer.

c) What kind of proof is this?

11. Mrs. Cook purchased a set of kitchen utensils advertised as a stainless steel product. After using the set for a few weeks, she discovered that some of the utensils were beginning to rust. She went back to the store, claimed that the set was not stainless steel, and asked for a refund.

In her conversation with the store manager, she used an indirect proof. Identify each of the following.

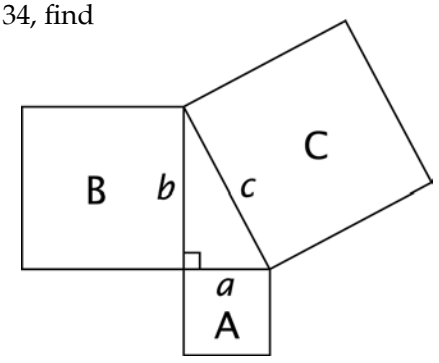
a) The statement she wanted to prove.

b) The assumption made.

c) The conclusion resulting from the assumption.

d) The known fact contradictory to part c.

12. In this figure, squares have been drawn on the sides of a right triangle. Given that $a = 16$ and $c = 34$, find



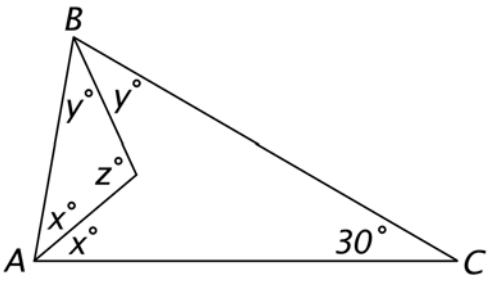
a) the area of square A.

b) the area of square C.

c) the area of square B.

d) b.

13. This figure appeared in a problem on an SAT exam.



Given that $\angle BAC = 80°$, find each of the following:

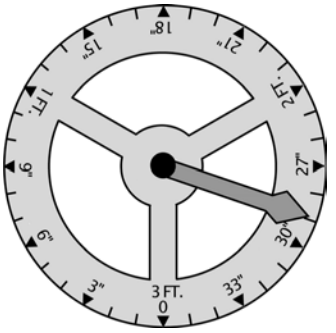
a) x.

b) $\angle ABC$.

c) y.

d) z.

14. A trundle wheel can be used to measure distance along the ground. The distance traveled in one revolution of the wheel is equal to the circumference of the wheel.



Given that the circumference of a trundle wheel is 3 feet, find

a) its diameter to the nearest 0.1 inch.

b) the distance that the wheel travels in making five revolutions.

Geometry	Test 2	Scope: Chapters 2	Total score: ____of 100	Name

1. a) _____

   _____

   b) _____

   _____

2. a) _____

   b) _____

3. a) _____

   b) _____

4. a) _____

   b) _____

   c) _____

   d) _____

   e) _____

5. a) _____

   b) _____

   _____

   c) _____

   _____

   d) _____

6. a) _____

   _____

   b) _____

   c) _____

7. a) _____

   b) _____

   _____

   _____

   _____

   _____

   c) _____

   _____

8. a) _____

   _____

   b) _____

   _____

   c) _____

   _____

   d) _____

   _____

   _____

   _____

   _____

9. a) _____

   b) _____

   c) _____

   d) _____

   e) _____

10. a) _____

_____

b) _____

_____

_____

c) _____

11. a) _____

_____

b) _____

_____

c) _____

d) _____

12. a) _____

b) _____

c) _____

d) _____

13. a) _____

b) _____

c) _____

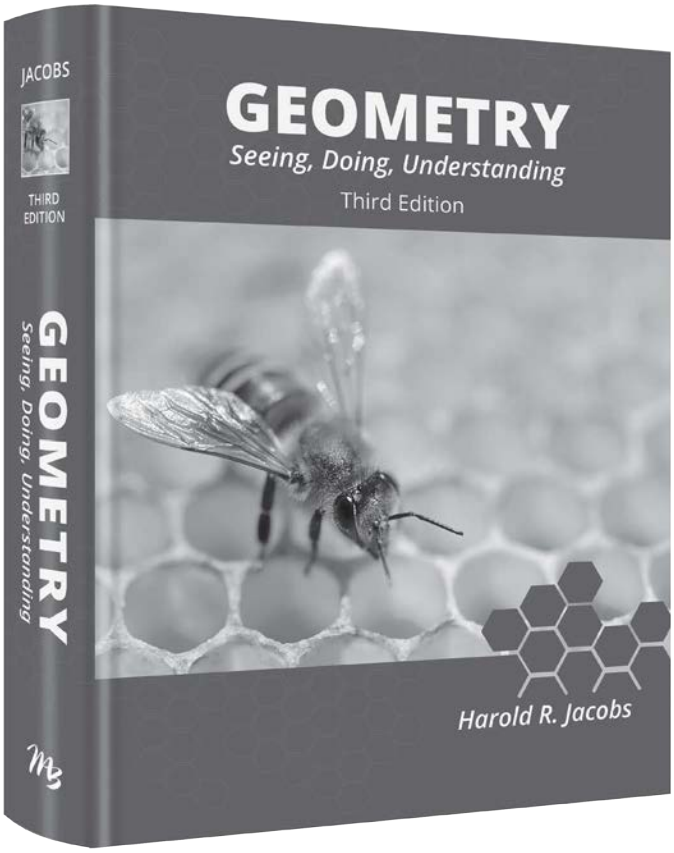
d) _____

14. a) _____

_____

b) _____

_____



Mid-Term and Final Tests

for Use with

Geometry: Seeing, Doing, Understanding

Write your answers to the following problems on your answer sheet.

1. Simplify: $x + x + x$.
2. Use the distributive rule to eliminate the parentheses: $x^2(4 - x)$.
3. Solve for x: $3(x + 7) = -12$.
4. Subtract: $(9x + y) - (x - y)$.
5. Factor: $5x^2 + 14x - 3$.
6. Reduce to lowest terms: $\frac{x - 3}{x^2 - 9}$.
7. Write as a single fraction in lowest terms: $\frac{x + 2}{4} - \frac{x}{8}$.
8. Write $\sqrt{72}$ in simple radical form.

Formulas are important in geometry as well as in algebra. Explain what each of these formulas means.

9. $c = \pi d$.
10. $A = s^2$.

The following questions refer to this statement:

All porcupines have long quills.

11. Write the statement in "if-then" form.
12. Does it follow that an animal that has long quills is a porcupine?
13. What relation does this idea have to the original statement?

Write the letter of the correct answer on your answer sheet.

14. If two angles of one triangle are equal to two angles of another triangle,
    a) the triangles must be congruent.
    b) the sides opposite them are equal.
    c) the triangles are equiangular.
    d) the third pair of angles must be equal.
15. If $a > b$, which one of the following inequalities must be true?
    a) $a^2 > b^2$.
    b) $a + c > b + c$.
    c) $ac > bc$.
    d) $a + b > 0$.
16. If a quadrilateral is equiangular,
    a) it is also equilateral.
    b) it is a square.
    c) it is a rectangle.
    d) it is concave.
17. Two angles are a linear pair. Which of the following must be true?
    a) The angles are equal.
    b) The angles are right angles.
    c) The angles are supplementary.
    d) All of these must be true.
18. If the legs of one right triangle are equal to the legs of another right triangle, which one of the following could be used to prove the triangles congruent?
    a) SAS.
    b) ASA.
    c) SSS.
    d) HL.
19. Which of the following could be the lengths of the sides of a triangle?
    a) 3, 7, 11.
    b) 4, 4, 8.
    c) 5, 12, 13.
    d) 6, 9, 15.
20. Two lines are parallel if the interior angles that they form on the same side of a transversal
    a) are right angles.
    b) are equal.
    c) are complementary.
    d) form a linear pair.
21. If all of the exterior angles of a triangle are obtuse, the triangle must be
    a) obtuse.
    b) equiangular.
    c) acute.
    d) scalene.
22. Which one of the following statements about the diagonals of a parallelogram is always true?
    a) They are equal.
    b) They are longer than the sides.
    c) They are perpendicular.
    d) They bisect each other.

23. If the sides of a triangle have lengths x, x, and y, its perimeter is
    a) $x^2 + y$.
    b) $2xy$.
    c) x^2y.
    d) $2x + y$.

Read the following statements carefully. If a statement is always true, write *true*. If not, *do not write false.* Instead, write a word or words that could replace the underlined word to make the statement true. Some of the questions in this section may have more than one correct answer; do not make a change in any statement that is always true however.

24. An obtuse triangle has two obtuse angles.
25. Three noncollinear points determine a plane.
26. The base angles of an isosceles trapezoid are equal.
27. The converse of every theorem is true.
28. The points on a line can be numbered so that positive number sums measure distances.
29. The diagonals of a rhombus are equal.
30. The word line is an undefined term in geometry.
31. If the x-coordinate of a point is 0, the point is on the x-axis.
32. A pentagon is a polygon that has eight sides.
33. Two angles are vertical angles if the sides of one angle are opposite rays to the sides of the other.
34. If $\angle A$ and $\angle B$ are supplementary and $\angle B$ and $\angle C$ are supplementary, than $\angle A$ and $\angle C$ are supplementary.
35. According to the Betweenness of Points Theorem, if A-B-C, then AB = BC.
36. To prove a theorem indirectly, we begin by assuming that the opposite of its conclusion is true.
37. If a triangle has two equal sides, it must be equilateral.
38. Two lines that do not intersect must be parallel.
39. The supplement of an acute angle is acute.
40. Through a point not on a line, there is exactly one line parallel to the given line.
41. The "Whole Greater than Part" Theorem says that if $a > 0$, $b > 0$, and $a + b = c$, then $a > c$ and $b > c$.
42. In a right triangle, the hypotenuse must be the longest side.
43. A square has two lines of symmetry.

Use your straightedge and compass to make the following constructions on your answer sheet.

44. Bisect $\angle A$.
45. Through D, construct a line perpendicular to BC.

Geometry	Mid-Term Test 1	Scope: Chapters 1–8	Total score: ____of 100	Name

1. _____ 5. _____

2. _____ 6. _____

3. _____ 7. _____

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14. _____ 18. _____ 22. _____

15. _____ 19. _____ 23. _____

16. _____ 20. _____

17. _____ 21. _____

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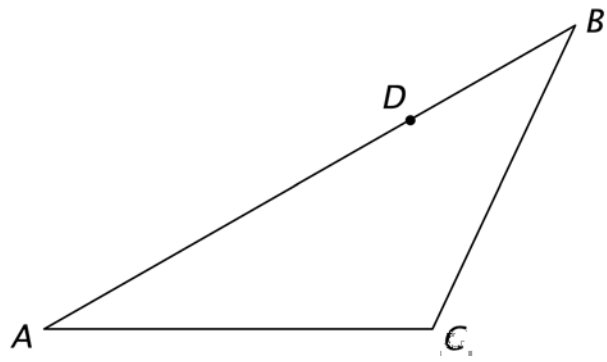
40. _____

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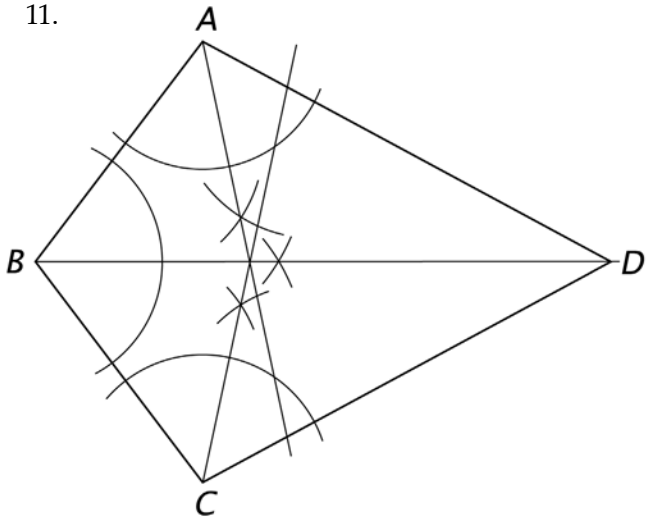
Answers for

Chapter, Mid-Term and Final Tests

Chapter Test 1

1. *Euclid.*
2. *A point.*
3. *A line extends without end in both directions.*

   A line segment is part of a line bounded by two endpoints.
4. *A rectangle is bounded by four line segments.*

   A plane has no boundaries.
5. *A polygon that has four sides.*
6. *A pentagon has five sides, so the pentathlon has five events.*
7. *An octopus has eight arms and an octagon has eight sides.*
8. *Triangles.*
9. *Three.*
10. *Coplanar.*
11. 

12. *They seem to be concurrent.*
13. *It also appears to bisect ∠D.*
14. *The perimeter of room A is 2(15 ft) + 2(18 ft) = 66 ft.*

    The perimeter of room B is 2(10 ft) + 2(24 ft) = 68 ft.

    Room B has the greater perimeter.
15. *The area of room A is (15 ft)(18 ft) = 270 sq ft.*

    The area of room B is (10 ft)(24 ft) = 240 sq ft.

    Room A has the greater area.
16. *7.3 cm.*

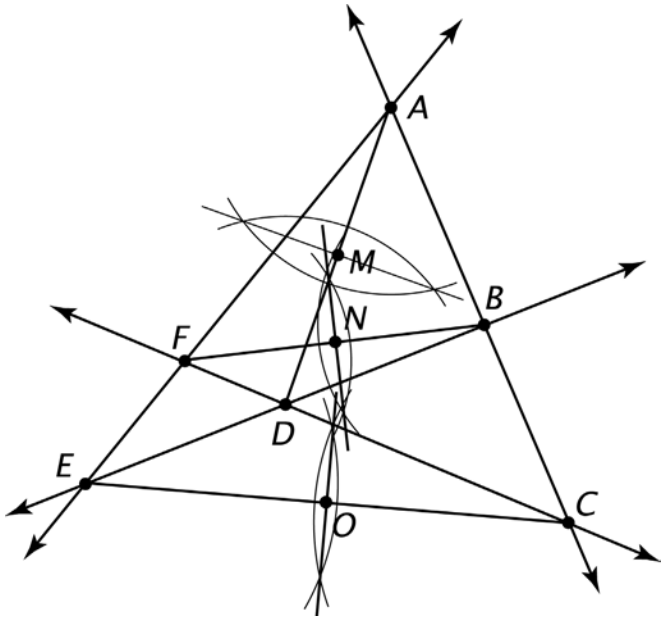
17. *7.8 cm.*

18. *62˚.*

19. *109˚.*

20. *FB appears to be longer than FD, but it is shorter.*

21.



22. *They seem to be collinear.*

23. *According to the formula used by the Egyptians for the area of a quadrilateral, the area of both quadrilaterals is* $\frac{1}{4}(4 + 4)(5 + 5) = \frac{1}{4}(8)(10) =$ *20 square units.*

This is correct for rectangle ABCD, whose area is 20 square units.

If quadrilateral ABEF is cut by a vertical line through point F, the two pieces can be rearranged to form a square with sides of 4 units, so its area is actually 16 square units.

Extra Credit

1. *(Student answer.) Two of the cards are clearly the 2 and 3 of diamonds. The card in back could be the ace of diamonds.*

2. *Someone might think that the card in back is the ace of diamonds whereas it is actually the ace of hearts.*

Chapter Test 2

1. a) *Associative property of multiplication.*

   b) *Commutative property of addition.*

2. a) $(13 - 5)^2 = 8^2 = 64$.

   b) $13^2 - 5^2 = 169 - 25 = 144$.

3. a) $4x^2$.

   b) $6x - x - y + 7y = 5x + 6y$.

4. a) *False.*

   b) *True.*

   c) *False.*

   d) *False.*

   e) *True.*

5. a) *An Euler diagram.*

   b) *If we don't have it, you don't want it.*

   c) *You don't want it if we don't have it.*

   d) *Statement 2.*

6. a) *If you watch Sesame Street, you love Eskimo pies.*

   b) *No.*

   c) *Yes.*

7. a) *If and only if.*

   b) *If you are an egotist, you are always me-deep in conversation.*

   If you are always me-deep in conversation, you are an egotist.

   c) *One statement is the converse of the other.*

8. a) *Definition. A statement that gives the meaning of a word.*

   b) *Postulate. A statement assumed true without proof.*

   c) *Theorem. A statement proved by reasoning deductively.*

d) *Euclid constructed the Geometry starting from definitions, postulates and axioms with which he demonstrated theorems.*

9. a) *True.*

b) *True.*

c) *True.*

d) *False.*

e) *True.*

10. a) *If the sky becomes dark, the crickets think that it is night.*

b) *If the crickets start chirping, the temperature is estimated by counting cricket chirps.*

c) *Direct.*

11. a) *The utensils are not stainless steel.*

b) *The utensils are stainless steel.*

c) *They will not rust.*

d) *They are rusting.*

12. a) $16^2 = 256$.

b) $34^2 = 1{,}156$.

c) $1{,}156 - 256 = 900$.

d) $\sqrt{900} = 30$.

13. a) $2x = 80$, so $x = 40$.

b) $\angle ABC = 180^\circ - 80^\circ - 30^\circ = 70^\circ$.

c) $2y = 70$, so $y = 35$.

d) $z = 180 - 40 - 35 = 105$.

14. a) $c = \pi d$, $36 = \pi d$, $d = \frac{36}{\pi} \approx 11.5$. 11.5 inches.

b) 5(3 feet) = 15 feet (or 180 inches).