Chapter 8 Answers

Practice 8-1
1. 1 : 278 2. 18 ft by 10 ft 3. 18 ft by 14 ft
4. 18 ft by 16 ft 5. 8 ft by 8 ft 6. 3 ft by 10 ft
7. true 8. false 9. true 10. true
11. false 12. true 13. true 14. false

Practice 8-2
1. \( \triangle ABC \sim \triangle XYZ \), with similarity ratio 2 : 1
2. \( \triangle QMN \sim \triangle RST \), with similarity ratio 5 : 3
3. Not similar; corresponding sides are not proportional.
4. Not similar; corresponding angles are not congruent.
5. \( \triangle ABC \sim \triangle KMN \), with similarity ratio 4 : 7
6. Not similar; corresponding sides are not proportional.
7. \( \angle I \) 8. \( \angle O \) 9. \( \angle J \) 10. \( \angle N \) 11. LO
12. LO 13. 3.96 ft 14. 4.8 in. 15. 3.75 cm
16. 10 m 17. 2 18. 53 19. 7 20. 4 21. 53 22. 23. 5

Practice 8-3
1. \( \triangle AXB \equiv \triangle RXQ \) because vertical angles are \( \equiv \).
2. Because \( \frac{MP}{CW} = \frac{PX}{WA} = \frac{XM}{AL} = \frac{3}{4} \).
3. \( \triangle QMP \equiv \angle AMB \) because vertical \( \angle s \) are \( \equiv \). Then, because \( \frac{QM}{AM} = \frac{PM}{BM} = \frac{3}{4} \), \( \triangle QMP \sim \triangle AMB \) by the SAS \( \sim \) Theorem.
4. \( \angle M \equiv \angle A \) (Given). Because there are 180° in a triangle, \( m \angle J = 130 \), and \( \angle J \equiv \angle C \). So \( \triangle MJN \sim \triangle ACB \) by the AA \( \sim \) Postulate.
5. Because \( AX = BX \) and \( CX = RX \), \( \frac{AX}{CX} = \frac{BX}{RX} \), \( \angle AXB \equiv \angle CXR \) because vertical angles are \( \equiv \). Therefore \( \triangle AXB \sim \triangle CXR \) by the SAS \( \sim \) Theorem.
6. Because \( AB = BC = CA \) and \( XY = YZ = ZX \), \( \frac{AB}{XY} = \frac{BC}{YZ} = \frac{CA}{XZ} \). Then \( \triangle ABC \sim \triangle XYZ \) by the SSS \( \sim \) Theorem.
7. \( \frac{5}{4} \) 8. \( \frac{5}{4} \) 9. \( \frac{4}{7} \)
10. \( \frac{85}{3} \) 11. \( \frac{20}{3} \) 12. 36 13. 33 ft

Practice 8-4
1. 16 2. 8 3. \( \sqrt{77} \) 4. \( 2\sqrt{11} \) 5. \( 10\sqrt{2} \)
6. \( 6\sqrt{5} \) 7. \( h \) 8. y 9. x 10. a 11. b
12. c 13. \( x = 6 ; y = 6 \sqrt{3} \) 14. \( x = 8 \sqrt{3} ; y = 4 \sqrt{3} \)
15. \( \frac{40}{89} \) 16. \( \frac{9}{7} \) 17. \( x = \sqrt{5} ; y = \sqrt{55} \)
18. \( \frac{45}{4} \) 19. \( x = \sqrt{3} ; y = \sqrt{6} ; z = \sqrt{2} \)
20. \( \frac{9}{3} ; y = \frac{12}{5} ; z = \frac{16}{5} \) 21. \( x = 8 ; y = 2 \sqrt{2} ; z = 6 \sqrt{2} \)
22. \( 2 \sqrt{15} \) in.

Practice 8-5
1. \( \overline{BE} \) 2. \( \overline{EH} \) 3. \( \overline{BC} \) 4. \( \overline{JD} \) 5. \( \overline{JG} \)
6. \( \overline{BE} \) 7. \( \frac{16}{7} \) 8. 4 9. 4 10. \( \frac{25}{7} \) 11. \( x = \frac{25}{7} \)
12. \( \frac{15}{4} \) 13. \( x = \frac{65}{12} ; y = \frac{91}{12} \) 14. \( x = 6 \)
15. \( x = \frac{189}{3} ; y = \frac{93}{3} \) 16. 2 17. 4
18. 10

Practice 8-6
1. 4 : 5 ; 16 : 25 2. 5 : 3 ; 25 : 9 3. 3 : 4 ; 9 : 16 4. 1 : 2
5. 9 : 5 6. 1 : 6 7. 8 : 3 8. \( \frac{550 \text{ in.}^2}{7} \) 9. \( \frac{2700 \text{ cm}^2}{7} \)
10. \( \frac{1152}{25} \text{ in.}^2 \) 11. 2 : 3 12. 1 : 2 13. 2 : 5
14. 108 ft²

Reteaching 8-1
1. 534 apples 2. 768 gallons 3. 4627 employees
4. about 4800 picture frames 5. 90 6. 2450 7. 85
13. 2500

Reteaching 8-2
1. \( \triangle KLM \sim \triangle QRS ; 5 : 3 \) 2. \( \triangle ABC \sim \triangle XYZ ; 10 : 7 \)
3. not similar 4. not similar 5. \( \triangle LMPR \sim \triangle QICK ; 1 : 1 \)
6. not similar 7. similar with ratio 10 : 11 8. not similar
9. similar with ratio 4 : 9

Reteaching 8-3
1. \( \triangle ABC \sim \triangle ZYX \) by AA 2. not similar
3. \( \triangle QEU \sim \triangle SIO \) by SSS 4. \( \triangle ABC \sim \triangle RST \)
by AA 5. not similar 6. \( \triangle BAC \sim \triangle XQR \) by SAS
7. yes; by SSS or by AA 8. No; the vertex angles may differ in measure.
9. All congruent triangles are similar with ratio 1 : 1. Similar triangles are not necessarily congruent.

Reteaching 8-4
1. \( x = \frac{18}{5} ; y = \frac{144}{13} ; z = \frac{60}{13} \) 2. \( x = \frac{400}{29} ; y = \frac{440}{29} \)
3. \( z = \frac{420}{29} \) 4. \( x = 4.8 ; y = 8 \) 5. \( x = \sqrt{2} ; y = \sqrt{5} ; z = \sqrt{6} \)
6. \( x = 2 \sqrt{10} \) 7. \( \frac{120}{18} \) 8. \( \frac{42}{\sqrt{85}} = \frac{42 \sqrt{85}}{85} \)
9. \( \frac{ab}{\sqrt{a^2 + b^2}} 

Reteaching 8-5
1. \( x = 4.5 \) 2. \( x = \frac{5}{2} \) 3. \( x = 7.2 ; y = 4.8 \)
4. \( x = \frac{15}{8} ; y = \frac{25}{8} \) 5. \( x = 9 \) 6. \( x = \frac{3}{2} ; y = \frac{5}{2} \)
7. \( BN = \frac{15}{5} ; CN = \frac{24}{5} \) 8. \( \overline{BY} = \frac{3}{2} \)

Reteaching 8-6
1. 4 : 3 ; 16 : 9 2. 8 : 5 ; 64 : 25 3. 9 : 5 ; 81 : 25
4. 4 : 3 5. 4 : 5 6. 3 : 5 7. 16 : 9 8. 16 : 25
9. 9 : 25
Chapter 8 Answers (continued)

Enrichment 8-1
1. 10 lb  2. $250; costs have not changed during the past year.  3. $240,000  4. $168,750  5. $6785  6. $106  7. 360 yd  8. 40  9. 42  10. 63

Enrichment 8-2
1.–4. Check students' work.

Enrichment 8-3
1. Statements
   a. $ABCD$ is a trapezoid
   b. $AD || BC$
   c. $\angle AED \equiv \angle CEB$
   d. $\triangle EBC \equiv \triangle EDA$
   e. $\Delta AED \sim \Delta CEB$

2. Statements
   a. $T, U,$ and $V$ are mdpts
   b. $\overline{TU} \parallel \overline{RV}, \overline{UV} \parallel \overline{TR},$ and $\overline{TV} \parallel \overline{US}$
   c. $\triangle TUV$ and $\triangle TUSV$ are parallelograms.
   d. $\angle TUV \equiv \angle R$
   e. $\angle UTV \equiv \angle S$
   f. $\triangle QRS \sim \triangle VUT$

   Using the distance formula, $AB = \sqrt{180}$ or $6\sqrt{5}$.
   $BC = \sqrt{45}$ or $3\sqrt{5}$, $CA = 15$, $ST = 10$, $TB = \sqrt{80}$ or $4\sqrt{5}$.
   $4\sqrt{5}$, and $BS = \sqrt{20}$ or $2\sqrt{5}$. If the two triangles are similar, then corresponding sides are proportional. Therefore,
   $\frac{CA}{ST} = \frac{15}{10} = \frac{3}{2} = \frac{AB}{TB} = \frac{6\sqrt{5}}{4\sqrt{5}} = \frac{3}{2} = \frac{BC}{BS} = \frac{3\sqrt{5}}{2\sqrt{5}} = \frac{3}{2}$.

   Because $\frac{CA}{ST} = \frac{AB}{TB} = \frac{BC}{BS}$, $\triangle ABC \sim \triangle TBS$ by the SSS Similarity Postulate.

Enrichment 8-4
1. The triangles have two congruent angles; AA Similarity Postulate.
2. $\frac{AB + BD}{DE} = \frac{AB}{BC}$
3. $BD = (\frac{DE - BC}{AB})AB$

4. 800 yd  5. 4500 ft  6. 43 ft  7. 9 m

Enrichment 8-5
1. 18  2. 1  3. 19  4. 3  5. 8  6. 7  7. 22  8. 9  9. 13  10. 4  11. 5  12. 6  13. 12  14. 17  15. 2  16. 10  17. 21  18. 15  19. 20 20. 16 ARCHIMEDES OF SYRACUSE

Enrichment 8-6
1. 1:4  2. 2:1  3. 4:3  4. 1:16

Chapter Project

Activity 1: Doing
Check students’ work.

Activity 2: Analyzing
Stage 1: $\frac{1}{12}; 4$
Stage 2: $\frac{1}{5}; \frac{5}{7}$
Stage 3: $192; \frac{1}{7}; \frac{7}{9}$

Activity 3: Doing
Check students’ work.

Activity 4: Thinking

The entire snowflake at each stage will be inside the regular hexagon. The area of the hexagon is 2 square units, so the area of the snowflake is always less than 2 square units.

Activity 5: Modeling
Check students’ work.

✔ Checkpoint Quiz 1
1. $\frac{6}{17}$  2. $1:48$  3. 11  4. 6  5. 0  6. MO  7. 3.6 ft  8. no: $\frac{8}{17} \neq \frac{3}{7}$  9. 780 mi

✔ Checkpoint Quiz 2
1. yes; AA similarity postulate  2. yes; SAS similarity postulate  3. 5  4. 13.7  5. $x = 4.5, y = 7.5$
6. $8\frac{1}{3}$  7. 2.5

Chapter 8 Test, Form A
1. 28  2. $\frac{24}{19}$  3. 45  4. $\frac{3}{2}$  5. $\triangle ABC \sim \triangle XYZ$ by the AA ~ Postulate  6. not similar  7. $\triangle KPM \sim \triangle RPQ$ by the SAS ~ Theorem  8. 30 ft  9. 9 10. $6\sqrt{5}$  11. B  12. 12  13. $\frac{3}{2}$  14. 6 15. $\frac{18}{7}$  16. Check students’ work.  17. If two parallel lines are cut by a transversal, alternate interior angles are congruent. Therefore, $\triangle ABC \sim \triangle EDC$ by the AA ~ Postulate.
18. 64 : 9  19. 9 : 1  20. $x = 9; y = 6\sqrt{3}; z = 3\sqrt{5}$
21. $x = \frac{40}{3}, y = \frac{5}{3}$  22. C  23. $\frac{60}{13}$

Chapter 8 Test, Form B
1. 6  2. 12  3. $\frac{9}{7}$  4. $\frac{3}{2}$  5. $\triangle ABC \sim \triangle EDC$ by the AA ~ Postulate  6. not similar  7. $\triangle ABC \sim \triangle RST$ by the SAS ~ Theorem  8. 24 ft  9. 12 10. $5\sqrt{2}$  11. C  12. 4  13. $\frac{21}{4}$  14. $45\frac{5}{17}$  15. 20  16. Check students’ work.  17. Sample: Each of the two smaller triangles contains a right angle because the altitude is perpendicular to $\overline{AC}$. Also, each of the smaller triangles shares an angle with $\triangle ABC$. Therefore, each of the smaller triangles is similar to $\triangle ABC$ by the AA ~ Postulate and, by transitivity, they are similar to each other.
18. 9 : 4  19. 9 : 1  20. $x = \frac{20}{7}; y = \frac{15}{7}$  21. $x = 30; y = 8\sqrt{15}; z = 2\sqrt{15}$  22. D  23. $\frac{60}{13}$
Alternative Assessment, Form C

**TASK 1: Scoring Guide**

AA Similarity Postulate and SAS and SSS Similarity Theorems; check students’ work.

3 Student gives correct answers and accurate drawings and explanations.
2 Student gives mostly correct answers, drawings, and explanations.
1 Student gives answers, drawings, and explanations that contain significant errors.
0 Student makes little or no effort.

**TASK 2: Scoring Guide**

Claim 1 is true, and Claim 2 is false. Claim 3 is partly true; the triangles are similar, but the ratio of the areas is 1 : 4, not 1 : 2.

3 Student gives correct answers and provides logical reasons to support the answers.
2 Student gives mostly correct answers, but the work may contain minor errors or omissions.
1 Student gives answers that contain significant errors.
0 Student makes little or no effort.

**TASK 3: Scoring Guide**

One method is to pick any point $A$ on land and measure $AB$ and $AC$. Then select a fraction (say, $\frac{1}{2}$), and mark $X$ and $Y$ halfway from $A$ to $B$ and $C$, respectively. Then measure $XY$. Then $BC = 2 \cdot XY$.

3 Student gives a mathematically correct procedure and explanation.
2 Student gives a procedure and explanation that may contain minor errors.
1 Student gives an invalid procedure or a valid procedure with little or no explanation.
0 Student makes little or no effort.

**TASK 4: Scoring Guide**

Comparing the adult to the baby, we have:
- ratio of heights $\approx 3.5 : 1$
- ratio of weights $\approx 27.6 : 1$
- ratio of head circumference $\approx 1.7 : 1$

Because the ratio of heights is not close to the ratio of head circumference, the baby and the adult are not similar. (The baby’s head will grow more slowly than the rest of the body.) Interestingly, the ratio of weights doesn’t suggest similarity either. If the two were similar, the ratio of the volume (and, therefore, of the weight) would be about $3.5^3$ to 1, or about $43 : 1$. But it is about $27.6 : 1$, suggesting that the adult is leaner than the baby. In summary, babies tend to be chubbier and have larger heads (proportionally) than adults.

3 Student gives a mathematically sound analysis.
2 Student gives an explanation that contains minor errors or omissions.
1 Student gives an explanation containing significant errors or omissions.
0 Student makes little or no effort.

**Cumulative Review**

13. D   14. D   15. A   16. $120 \text{ m}^2$   17. 10
18. Congruent triangles have congruent corresponding angles and congruent corresponding sides, so they have a similarity ratio of 1 : 1. Similar triangles have congruent corresponding angles but do not necessarily have congruent corresponding sides.
19. Sample:

20. If cows do not have six legs, then pigs cannot fly.