Chapter 7

Extra Practice: Skills, Word Problems, and Proof

Lesson 7-1

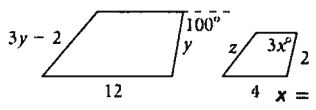
Algebra Solve each proportion.

1. $\frac{2}{3} = \frac{x}{15}$ 10
2. $\frac{4}{9} = \frac{16}{x}$ 36
3. $\frac{x}{4} = \frac{6}{12}$ 2
4. $\frac{2}{x} = \frac{3}{9}$ 6
5. $\frac{3}{4} = \frac{x}{6}$ $\frac{9}{2}$
6. $\frac{3}{7} = \frac{9}{x}$ 21

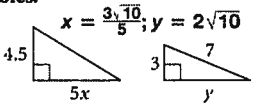
Lesson 7-2

Algebra The polygons are similar. Find the values of the variables.

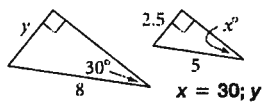
7. $x = \frac{80}{3}$; $y = 6$; $z = \frac{16}{3}$



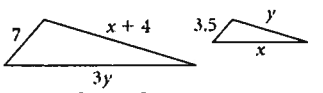
8. $x = \frac{3\sqrt{10}}{5}$; $y = 2\sqrt{10}$



9. $x = 30$; $y = 4$



10. $x = 12$; $y = 8$

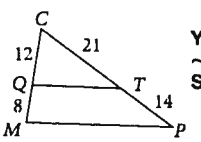


11. Are all equilateral quadrilaterals similar? Make a sketch to support your answer. **No; sample sketch: a square and a rhombus**

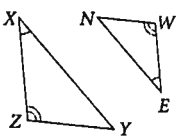
Lesson 7-3

Can you prove that the triangles are similar? If so, write a similarity statement and tell whether you would use AA~, SAS~, or SSS~.

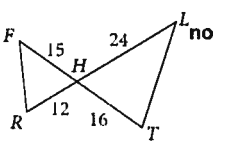
12. **Yes; $\triangle QCT \sim \triangle MCP$ by SAS~.**



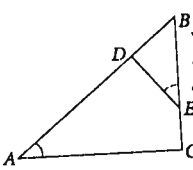
13. **Yes; $\triangle XZY \sim \triangle EWN$ by AA~.**



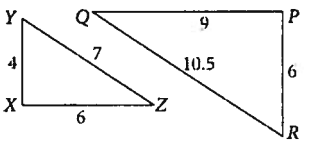
14. **no**



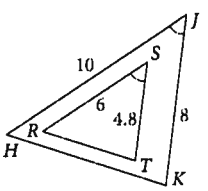
15. **Yes; $\triangle ABC \sim \triangle EBD$ by AA~.**



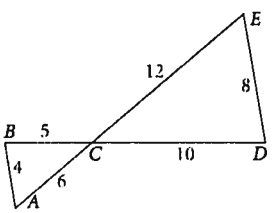
16. **Yes; $\triangle XYZ \sim \triangle PRQ$ by SSS~.**



17. **Yes; $\triangle HJK \sim \triangle RST$ by SAS~.**



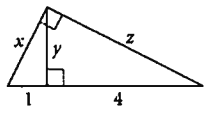
18. Refer to the figure at the right. Explain how you know that $\overline{AB} \parallel \overline{ED}$.
$\triangle CAB \sim \triangle CED$ by SSS~. $\angle A \cong \angle E$ as corres. $\measuredangle$ of $\sim \triangle$, so $\overline{AB} \parallel \overline{ED}$ by the Conv. of the Alt. Int. $\measuredangle$ Thm.



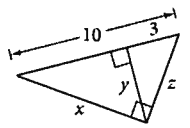
Lesson 7-4

Algebra Find the value of each variable. If an answer is not a whole number, leave it in simplest radical form. 19–22. See margin.

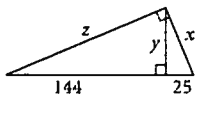
19.



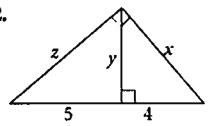
20.



21.

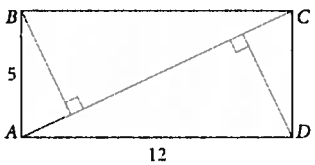


22.



23. Give a coordinate proof of the converse of Corollary 1 to Theorem 7-3. That is, prove that if $\overline{CD}$ is the altitude from C to side $\overline{AB}$ of $\triangle ABC$, and if CD is the geometric mean of AD and DB, then $\triangle ABC$ is a right triangle with its right angle at C. **See margin.**

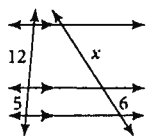
24. An artist is going to cut four similar right triangles from a rectangular piece of paper like the one shown below. What is the distance from B and D to the diagonal $\overline{AC}$? $\frac{60}{13}$



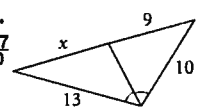
Lesson 7-5

Algebra Find the value of x.

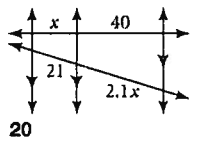
25. $\frac{72}{5}$



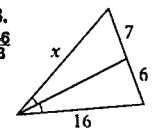
26. $\frac{117}{10}$



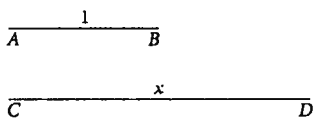
27. 20



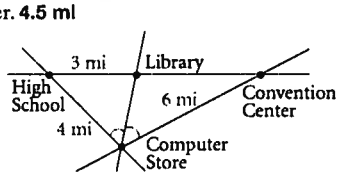
28. $\frac{56}{3}$



29. Suppose you are given a segment $\overline{AB}$ of length 1 unit and a segment $\overline{CD}$ of length x units. Show how you can apply the Side-Splitter Theorem to construct a segment of length $\frac{1}{x}$. **See margin.**



30. The figure below shows the locations of a high school, a computer store, a library, and a convention center. The street along which the computer store and library are located bisects the obtuse angle formed by two of the other streets. Use the information in the figure to find the distance from the library to the convention center. **4.5 mi**



19. $x = \sqrt{5}$; $y = 2$; $z = 2\sqrt{5}$

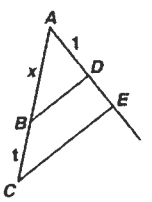
20. $x = \sqrt{70}$; $y = \sqrt{21}$; $z = \sqrt{30}$

21. $x = 65$; $y = 60$; $z = 156$

22. $\triangle ABC \sim \triangle EDC$ by SSS~, so $\angle A \cong \angle E$. Thus, $\overline{AB} \cong \overline{ED}$ by the Conv. of the Alt Int. $\angle$ Thm.

23. Place $\triangle ABC$ in the coordinate plane with $A(-a, 0)$, $B(b, 0)$, $C(0, \sqrt{ab})$ (given), and $D(0, 0)$. Slope of $\overleftrightarrow{AC} = \frac{\sqrt{ab}}{a}$. Slope of $\overleftrightarrow{BC} = \frac{\sqrt{ab}}{b}$. The product] $\frac{\sqrt{ab}}{-a} \cdot \frac{\sqrt{ab}}{b} = \frac{ab}{-ab} = -1$, so $\overleftrightarrow{AC} \perp \overleftrightarrow{BC}$.

29.



Construct $\overline{AC}$ with $AB = x$ and $BC = 1$. On another line from A, constuct $\overline{AD}$ of length 1. Construct a line through $C \parallel$ to $\overline{BD}$ and intersecting $\overline{AD}$ in E. By the Side-Splitter Thm., $\frac{x}{1} = \frac{1}{DE}$, so $DE = \frac{1}{x}$.