Answers for 6.4

For use with pages 384–387

6.4 Skill Practice

1. similar

2. No; the ratio of corresponding sides would be the same but they would not necessarily be congruent.

3. $\triangle FED$ **4.** EF, FD, DE

5. $15, y$ **6.** $15, x$

7. 20 **8.** 30

9. similar; $\triangle FGH \sim \triangle KLJ$

10. similar; $\triangle NYM \sim \triangle ZYX$

11. not similar

12. similar; $\triangle CBD \sim \triangle CAE$

13. similar; $\triangle YZX \sim \triangle YWU$

14. similar; $\triangle NMP \sim \triangle NLQ$

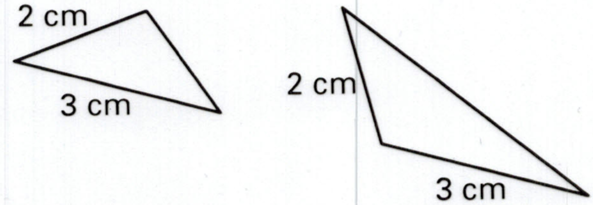
15. The AA Similarity Postulate is for triangles, not quadrilaterals.

16. B

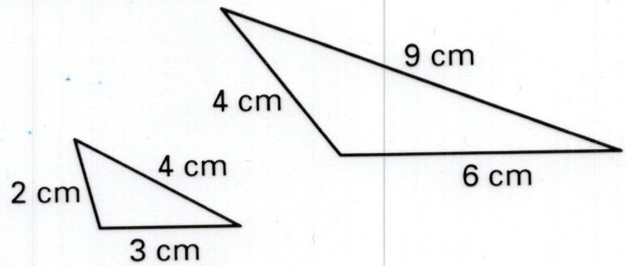
17. 5 should be replaced by 9, which is the length of the corresponding side of the larger triangle.

Sample answer: $\frac{4}{6} = \frac{9}{x}$

18. *Sample:*



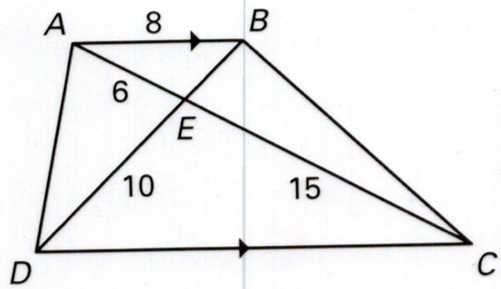
19. *Sample:*



20. A **21.** $(10, 0)$ **22.** $\left(\frac{28}{3}, 0\right)$

23. $(24, 0)$ **24.** $\left(\frac{9}{2}, 0\right)$

25. a.



b. *Sample answer:* $\angle ABE$ and $\angle CDE$, $\angle BAE$ and $\angle DCE$

c. $\triangle ABE$ and $\triangle CDE$, $\triangle ABE \sim \triangle CDE$

d. 4, 20

26. Yes; in $\triangle JKL$ $m\angle L = 57°$ making the triangles similar by the AA Similarity Postulate.

27. Yes; either $m\angle X$ or $m\angle Y$ could be 90°, and the other angles could be the same.

28. No; $87° + 94° = 181°$ is already greater than the possible total measure for three angles in a triangle.

29. No; since $m\angle J + m\angle K = 85°$ then $m\angle L = 95°$. Since $m\angle Y + m\angle Z = 80°$ then $m\angle X = 100°$ and thus neither $\angle Y$ nor $\angle Z$ can measure 95°.

30. $\frac{4}{3}x$; solve the proportion

$$\frac{a}{a + \frac{8}{3}x} = \frac{x}{3x} \text{ where } PS = a.$$

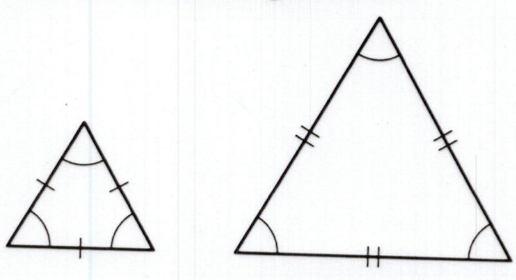
6.4 Problem Solving

31. about 30.8 in.

32. a. Angle-Angle Similarity Postulate

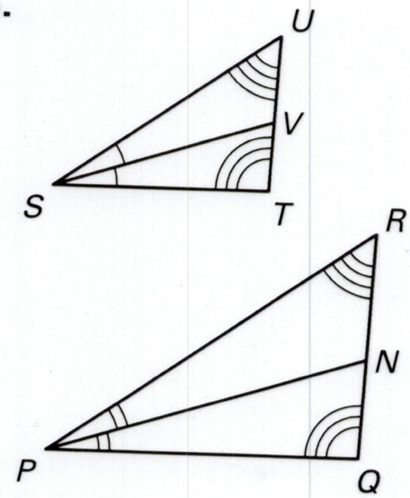
b. 78 m **c.** 130 m

33. The measure of all angles in an equilateral triangle is 60°.



34. $133\frac{1}{3}$ m

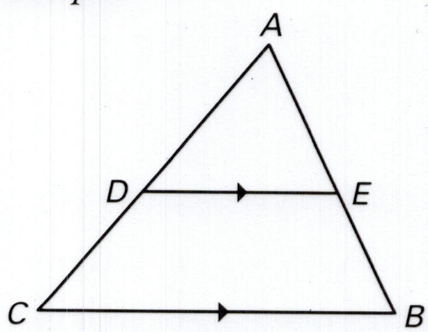
35.



Since $\triangle STU \sim \triangle PQR$ you know that $\angle T \cong \angle Q$ and $\angle UST \cong \angle RPQ$. Since $\overline{SV}$ bisects $\angle TSU$ and $\overline{PN}$ bisects $\angle QPR$ you know that $\angle USV \cong \angle VST$ and $\angle RPN \cong \angle NPQ$ by definition of angle bisector. You know that $m\angle USV + m\angle VST = m\angle UST$ and $m\angle RPN + m\angle NPQ = m\angle RPQ$, therefore $2m\angle VST = 2m\angle NPQ$ using the Substitution Property of Equality. You now have $\angle VST \cong \angle NPQ$ which makes $\triangle VST \sim \triangle NPQ$ using the AA Similarity Postulate. From this you know that $\frac{SV}{PN} = \frac{ST}{PQ}$.

36. *Sample answer:* If $\angle ACB$ and $\angle EFB$ are right angles, then they are congruent. This, along with the fact that $\angle A \cong \angle E$, makes $\triangle ABC \sim \triangle EDF$ by the AA Similarity Postulate.

37. a. *Sample:*



b. $m\angle ADE = m\angle ACB$ and $m\angle AED = m\angle ABC$

c. $\triangle ADE \sim \triangle ACB$

d. *Sample answer:*

$$\frac{AD}{AC} = \frac{AE}{AB} = \frac{DE}{CB} = \frac{1}{2}$$

e. The measures of the angles change, but the equalities remain the same. The lengths of the sides change, but they remain proportional; yes; the triangles remain similar by the AA Similarity Postulate.

38. Since the two triangles are similar, the ratios of the corresponding sides are the same; therefore compare the vertical rise to the horizontal run.

39. Let $\triangle ABC \sim \triangle DEF$, let $\overline{AN}$ bisect $\angle BAC$, and let $\overline{DM}$ bisect $\angle EDF$. By the definition of similar triangles, $\angle B \cong \angle E$ and $\angle BAC \cong \angle EDF$. By the definition of angle bisector, $\angle BAN \cong \angle NAC$ and $\angle EDM \cong \angle MDF$. The Angle Addition Postulate gives $m\angle BAN + m\angle NAC = m\angle BAC$ and $m\angle EDM + m\angle MDF = m\angle EDF$. By substitution we get $m\angle BAN + m\angle NAC = m\angle EDM + m\angle MDF$, and then $m\angle BAN + m\angle BAN = m\angle EDM + m\angle EDM$, and then $2m\angle BAN = 2m\angle EDM$, so $m\angle BAN = m\angle EDM$. Now, by the AA Similarity Postulate,

$\triangle BAN \sim \triangle EDM$ so $\dfrac{AN}{DM} = \dfrac{AB}{DE}$

where $\dfrac{AB}{DE}$ is the scale factor.

40. The two right triangles formed by the altitudes and the two sides measuring a and b are similar by the AA Similarity Postulate. Since the ratio of the hypotenuses is $\dfrac{b}{a}$ then the ratio of corresponding sides, which are the altitudes of the original triangles is the same ratio by Corresponding Lengths in Similar Polygons.

Pg 387

6.4 Mixed Review

41. *Sample answer:* $\angle 1$ and $\angle 5$, $\angle 3$ and $\angle 7$, $\angle 2$ and $\angle 6$

42. $\angle 3$ and $\angle 6$, $\angle 4$ and $\angle 5$

43. $\angle 1$ and $\angle 8$, $\angle 2$ and $\angle 7$

44. $180°$

45. $\angle BEA \cong \angle CED$ using the Vertical Angles Congruence Theorem making $\triangle ABE \cong \triangle CDE$ by the SAS Congruence Theorem.

46. $\frac{1}{5}$

47. $\frac{2}{1}$

48. $1:3$

49. $3:2$