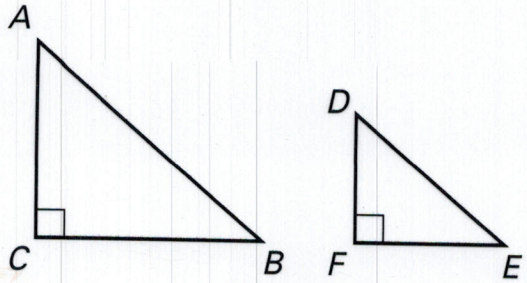
Answers for 11.3

For use with pages 740–745

11.3 Skill Practice

1. 

$\triangle ABC \sim \triangle DEF$ tells you that the sides in the same position are proportional. $\overline{AB}$ is proportional to $\overline{DE}$ because the sides are both the hypotenuse of their respective triangles and are listed in the same order in the similarity statement.

2. No; the ratio of perimeters is the same as the ratio of side lengths, and the ratio of areas is the square of the ratio of sides lengths by Theorem 11.7.

3. 6 : 11, 36 : 121

4. 5 : 9, 5 : 9, 25 : 81

5. 1 : 3, 1 : 9; 18 ft^2

6. 3 : 4, 9 : 16; 135 cm^2

7. 7 : 9, 49: 81; about 127 $in.^2$

8. 5 : 3, 25 : 9; 14.4 yd^2

9. 7 : 4 **10.** 4 : 11 **11.** 11 : 12

12. C **13.** 8 cm **14.** 15 in.

15. The ratio of areas is 1 : 4, so the ratio of side lengths is 1 : 2; $ZY = 2(12) = 24$.

16. about 1350 cm^2

17. 175 ft^2; 10 ft, 5.6 ft

18. Case 3, Case 1, Case 2; in Case 3 the enlargement is $\sqrt{5}$ which is about 2.24, which is less than an enlargement of 3 in Case 1 which is less than an enlargement of 4 in Case 2.

19. Never; doubling the side length of a square always quadruples the area.

20. Sometimes; only when the octagons are also congruent will the perimeters be the same.

21. The triangles are similar since the ratio of the sides of $\triangle ABC$ to $\triangle DEF$ is 3 : 4. So, the ratio of the area must be 9 : 16. Use this ratio with the area of $\triangle ABC$ to find the area of $\triangle DEF$.

22. 4 : 1

23. AA Similarity Postulate; $\frac{10}{35} = \frac{2}{7}$ is the ratio of side lengths, so the ratio of areas is 4 : 49.

24. $YUWX$ is a square, so $\overline{YX} \parallel \overline{UW}$; therefore $\angle YTU \cong \angle WUV$. $\overline{UW} \perp \overline{XV}$, so $\angle UWV$ is 90°; so the AA Similarity Postulate states that $\triangle VTU \sim \triangle WUV$. In $\triangle UVW$, the side opposite the 30° angle is given as $\sqrt{3}$. In $\triangle TUY$, $\overline{YU}$ is $\sqrt{3}$, so by the properties of 30°-60°-90° triangles, the side opposite the 30° angle is 1. So the ratio of side lengths is $1:\sqrt{3}$, which makes the ratio of the areas $1:3$

25. a. 6, 9, 5.4, 9.6; the ratio of areas is $9:25$, so the ratio of side lengths is $3:5$. Since we are given that $CG = 10$, then the side ratio tells us that $AG = 6$, and we are given that $GE = 15$, so $GB = 9$. We can also show that $\triangle AGF \sim \triangle CGB$ by the AA Similarity Postulate and has a side ratio of $6:10$, so $GF = 5.4$. Since $\overline{GF}$ is on $\overline{GE}$, $15 - 5.4 = 9.6$ is the length of $\overline{FE}$.

b. *Sample answer:* $1:1$, $72:72$, for $\triangle ABC$ which is congruent to $\triangle CDA$

11.3 Problem Solving

26. $8\frac{1}{3}$ ft^2 **27.** 15 ft **28.** B

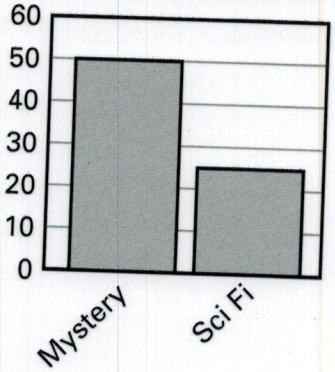
29. a, b. Check students' work.

b. The area of the smaller triangle is one-fourth the area of the larger triangle.

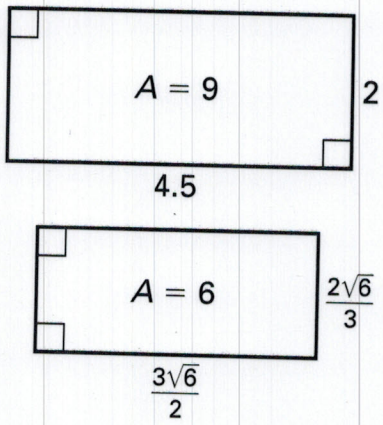
30. Check students' work. The results should be side ratio $a:b$ and area ratio $a^2:b^2$.

31. There were twice as many mysteries read, but the area of the mystery bar is about 4 times the area of the science fiction bar, giving the impression that 4 times as many mysteries were read.

Books Read Recently



32.



$3 : \sqrt{6} = \sqrt{6} : 2$

33. a. $\triangle ACD \sim \triangle AEB$, $\triangle BCF \sim \triangle DEF$; AA Similarity Postulate

b. *Sample answer:* 100 : 81

c. $\frac{10}{9} = \frac{20}{10 + x}$

$180 = 100 + 10x$

$x = 8$

or

$20(9) = (10 + x)(10)$

$180 = 100 + 10x$

$x = 8$

34. a. M and N are vertices of the cube, and therefore $\overline{MP} \cong \overline{NP}$ and forms a right angle by the definition of a cube. Also since $\overline{JL} \cong \overline{KL}$ and all angles with vertices at L measure 90°, you have SAS Similarity.

b. 1 : 18

c. 1 : 17

11.3 Mixed Review

35. 12.56 cm **36.** 31.40 ft

37. 15.70 yd **38.** 19.47 m

39. 20 **40.** 170 **41.** 46

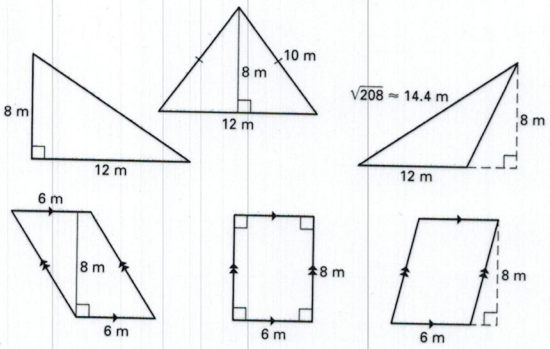
11.1–11.3 Mixed Review of Problem Solving

1. a. The four edges represents the hypotenuses of triangles with the same side lengths.

b. 142.5 ft^2, 71.25 ft^2

c. about $49.88

2.



The formula for the area of a triangle is $A = \frac{1}{2}bh$. As long as $h = 8$ and the area is 48, the base of the triangle can be 12 meters and shaped in various ways to create different triangles. For the parallelograms, a rectangle that is 8 meters by 6 meters has an area of 48 square meters; show two differently shaped parallelograms with base 6 meters and height 8 meters.

3. a. 252 small tiles, 112 large tiles

b. \$252, \$378; large tiles

c. The ratio of side lengths is 2 : 3, the ratios of areas is 4 : 9, and the ratio of costs is 2 : 3; side length; the ratio of cost is 2 : 3 which is the ratio of the side lengths.

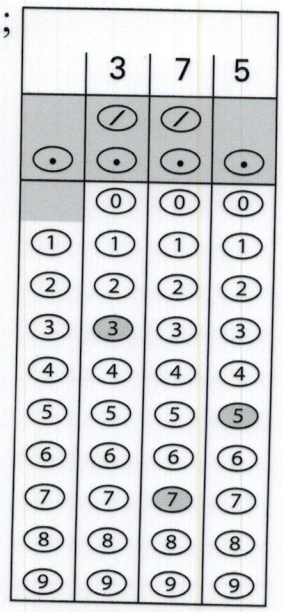
4. 4 times larger; 9 times larger; n^2 times larger; the formula for the area of a rhombus is $\frac{1}{2}d_1d_2$, if you multiply each diagonal by the same value n, you get $\frac{1}{2}(nd_1)(nd_2)$ which simplifies to $\frac{1}{2}n^2d_1d_2$.

5. a. 820 ft^2

b. about 180 ft

c. about 1386 ft^2; about 566 ft^2

6. 375 in.;



7. a. 10 units; since $\triangle EFH$ is a right isosceles triangle with side length $EF = 5\sqrt{2}$, then $\overline{EH}$ must also measure $5\sqrt{2}$. Therefore the Pythagorean Theorem gives $FH = 10$.

b. $5 + 5\sqrt{3}$; in $\triangle FJG$, $FG = 10$ because it is an equilateral triangle. Using the properties of 30°-60°-90° triangles and 45°-45°-90° triangles, $EJ = 5$ and $JG = 5\sqrt{3}$.

c. about 68.3 square units