15. $r = 10\sqrt{2}, s = 10$ **16.** $n = 30, p = 15, q = 15\sqrt{3}$ **17.** $x = 45, y = 12\sqrt{2}$
18. $a = 4\sqrt{3}, b = 2\sqrt{3}$ **19.** $c = 12\sqrt{2}, d = 24$
20. $f = 8\sqrt{3}, g = 8, h = 8\sqrt{2}$ **21.** 30°-60°-90°
22. neither **23.** 45°-45°-90°
24. a. $x = y = 12\sqrt{2}$ ft **b.** 1188 ft^2
25. a. $a \approx 97$ cm, $b = d = 112$ cm, $c \approx 158$ cm **b.** $a = 56$ cm, $b = d \approx 79$ cm, $c = 112$ cm

Practice Level C

1. $x = 8\sqrt{3}, y = 12$ **2.** $x = 7, y = 7$
3. $x = \frac{15}{2}, y = \frac{5\sqrt{3}}{2}$ **4.** $x = \frac{15}{2}, y = \frac{15\sqrt{3}}{2}$
5. $x = 5\sqrt{3}, y = 10$ **6.** $x = 14, y = 14\sqrt{2}$
7. $x = 24\sqrt{3}, y = 36$ **8.** $x = 9\sqrt{2}, y = 9$
9. $x = \frac{16\sqrt{3}}{3}, y = \frac{32\sqrt{3}}{3}$ **10.** $x = 12, y = 8\sqrt{3}$
11. $x = 9\sqrt{2}, y = 9$ **12.** $x = \frac{7\sqrt{3}}{3}, y = \frac{14\sqrt{3}}{3}$
13. B **14.** 41.6 cm **15.** 72 in.^{2} **16.** 12.6 ft
17. 13.0 m **18.** 6.5 mi **19.** 5600.3 ft
20. 5600.3 ft **21.** more **22.** 52.0 ft **23.** 39.0 ft
24. 77.9 ft

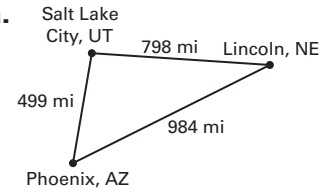
Study Guide

1. 9 **2.** 30 **3.** $25\sqrt{2}$ **4.** $12\sqrt{3}$ **5.** 26 **6.** 21
7. 10 **8.** 62

Problem Solving Workshop: Mixed Problem Solving

1. a. 180 ft **b.** 15 **c.** $270

2. a.



b. no; obtuse **3.** about 10.4 mi; Find the distance each person traveled in 1 hour 45 minutes. Since Peter walks north and Denise walks east, their distances are the two legs of a right triangle. Use the Pythagorean Theorem to find the distance between them. **4.** 29 paces

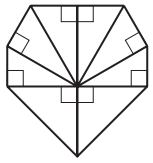
5. a. Yes; The diagonal of the room is about 9.8 feet, so the lumber can fit diagonally in the trailer. **b.** No; The diagonal of the trailer is about 17.5 feet. Since this is the longest distance in the room, a 20 foot pipe cannot fit in the room.

c. $d = \sqrt{\ell^2 + w^2 + h^2}$; From the equations above, let $\ell = AC$, $w = BC$, $b = AB$, and $h = AD$, where b is the length of the diagonal of the base. Rewrite the first equation given as $b = \sqrt{\ell^2 + w^2}$. Rewrite the second equation as $d = \sqrt{b^2 + h^2}$. Substitute for b in the second equation to obtain

$$d = \sqrt{b^2 + h^2}$$
$$= \sqrt{(\sqrt{\ell^2 + w^2})^2 + h^2}$$
$$= \sqrt{\ell^2 + w^2 + h^2}.$$

Challenge Practice

1. Yes; *Sample answer:*



2. 5.46
3. 4 points; (1, 1), (1, −1), (−1, 1), (−1, −1)
4. The shortest leg of the 30°-60°-90° triangle is the hypotenuse of the 45°-45°-90° triangle. The hypotenuse of the 45°-40°-90° triangle is $x\sqrt{2}$. Using 30°-60°-90° triangle properties, the length y is equal to two times the shortest leg of the 30°-60°-90° triangle. $y = 2 \cdot x\sqrt{2} = 2x\sqrt{2}$. As long as x is an integer, $2x\sqrt{2}$ will always be irrational, so y can never be an integer.
5. $VW \approx 2.54$, $VX \approx 9.80$, $WX \approx 9.46$
6. $BC = \frac{1}{2}$, $BD \approx 1.8$

Lesson 7.5

Teaching Guide

1. 91 ft **2.** 208 ft **3.** 29 ft

Practice Level A

1. $\tan A = \frac{3}{4} = 0.75$, $\tan B = \frac{4}{3} = 1.3333$
2. $\tan A = \frac{21}{20} = 1.05$, $\tan B = \frac{20}{21} = 0.9524$
3. $\tan A = \frac{5}{12} = 0.4167$, $\tan B = \frac{12}{5} = 2.4$
4. $\tan A = \frac{24}{7} = 3.4286$, $\tan B = \frac{7}{24} = 0.2917$
5. $\tan A = \frac{45}{28} = 1.6071$, $\tan B = \frac{28}{45} = 0.6222$
6. $\tan A = \frac{8}{15} = 0.5333$, $\tan B = \frac{15}{8} = 1.875$
7. 8.7 **8.** 22 **9.** 16.8 **10.** 42.8 **11.** 25
12. 20.6 **13.** 5; 5 **14.** 6; 6 **15.** 6; 6 **16.** 10.1
17. 35.8 **18.** 60 **19.** 86.6 cm^2 **20.** 68.6 ft^2