Answers for Lesson 8-3, pp. 434–437 Exercises

1. $\frac{1}{2}$; 2 **2.** $\frac{2}{3}$; $\frac{3}{2}$ **3.** 1; 1 **4.** 11.2

5. 12.3 **6.** 14.4 **7.** 2.5 **8.** 1.6

9. 21.4 **10.** about 50 yd

11. 32 **12.** 58 **13.** 48 **14.** 65

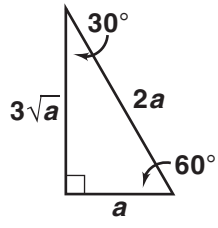
15. 63 **16.** 58 **17.** 74.1 **18.** 13.5

19. 114.5 **20.** 89.4

21. 44 and 136 **22.** 52 m

23. D

24. Consider a 30-60-90 $\triangle$. Let the length of the shorter side be a. Then the length of the longer side, opposite the 60°$\angle$, is $a\sqrt{3}$. Thus, $\tan 60° = \frac{a\sqrt{3}}{a} = \sqrt{3}$.



25. $\frac{\sqrt{2}}{\sqrt{2}} = 1$, so we have to show $\tan^{-1} 1 = 45°$. This is equivalent to showing $1 = \tan 45°$. Consider a 45-45-90 $\triangle$. Let the lengths of the shorter sides be a. Thus, $\tan 45° = \frac{a}{a} = 1$.

26. 152° and 28°

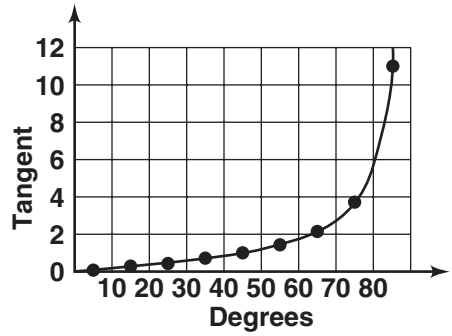
27. $w = 5; x \approx 4.7$

28. $w \approx 6.7; x \approx 8.1$

29. $w \approx 59; x \approx 36$

30. a. 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1; 1.2; 1.4; 1.7; 2.1; 2.7; 3.7; 5.7; 11.4

b.



c. approaches 0; increases to infinity

d. Answers may vary. Samples: 82; 2.5; 74

31. about 51°

32. about 701 ft

33. about 296 ft

34. about 58.4%

35. 71.6

36. 60.0

37. 45.0

38. 30.0

39. 22.4

40. 10.4

41. 6.0

42. 3.5

43. 1.6

44. a. No; answers may vary. Sample: $\tan 45° + \tan 30° \approx 1 + 0.6 = 1.6$, but $\tan(45 + 30)° = \tan 75° \approx 3.7$

b. No; Assume $\tan A° - \tan B° = \tan(A - B)°$, or $\tan A° = \tan B° + \tan(A - B)°$. Let $A = B + C$, so by subst., $\tan(B + C)° = \tan B° + \tan C°$. This is false by part (a).

45. a. 57.290

b. 572.96

c. Answers may vary. Sample: $\tan X° \approx 572{,}958$ for $X° = 89.9999$

d. Answers may vary. Sample: In a rt. $\triangle$, as an acute $\angle$ approaches 90°, the opp. side gets longer.

46. a. Every Y_1 value $= 1$.

b. The graph is that of $Y_1 = 1$.

c. Conjecture: $\tan x^\circ \cdot \tan(90 - x)^\circ = 1$. Proof: Let x be an acute $\angle$ measure in a rt. $\triangle$. Then the other acute $\angle$ measures $(90 - x)$. So $\tan x^\circ = \frac{\text{opp.}}{\text{adj.}}$, and $\tan (90 - x)^\circ = \frac{\text{adj.}}{\text{opp.}}$. Therefore, $\tan x^\circ \cdot \tan(90 - x)^\circ = \frac{\text{opp.}}{\text{adj.}} \cdot \frac{\text{adj.}}{\text{opp.}} = 1$.

47. 42 **48.** 75 **49.** 6

50. 50 **51.** x **52.** $m\angle X$

53. 26.6 **54.** 80.5 **55.** 78.7

56. 53.1 **57.** 36.9 **58.** 33.7