Name ______________________________ Class ____________ Date __________

Extra Practice

Chapter 14

Lesson 14-1

Simplify each trigonometric expression.

1. $\tan^2\theta - \sec^2\theta$

2. $\sin\theta\sec\theta$

3. $\dfrac{\tan\theta\sin\theta}{\cos\theta}$

4. $\dfrac{\csc\theta}{\sec\theta}$

5. $\dfrac{1+\tan^2\theta}{1+\cot^2\theta}$

6. $\dfrac{\sin\theta\left(\sec^2\theta - \tan^2\theta\right)}{\csc\theta}$

Lesson 14-2

Use a unit circle and 30°–60°–90° triangles to find the degree measures of each angle.

7. angles whose sine is $\dfrac{\sqrt{3}}{2}$

8. angles whose cosine is $-\dfrac{1}{2}$

9. angles whose tangent is $\sqrt{3}$

Use a calculator and inverse functions to find the radian measures of all angles having the given trigonometric values.

10. angles whose tangent is −1.6

11. angles whose sine is 1.2

12. angles whose cosine is 0.5

13. angles whose tangent is 1.3

Solve each equation for θ for $0 \le \theta \le 2\pi$.

14. $2\sin\theta = \sqrt{3}$

15. $\cos^2\theta - 1 = 0$

16. $2\tan\theta + 3 = \tan\theta$

17. $\cos\theta + \cos\theta\sin\theta = 0$

Lesson 14-3

In $\triangle ABC$, $\angle C$ is a right angle. Find the remaining sides and angles. Round your answer to the nearest tenth.

18. $m\angle A = 29°$, $b = 8$

19. $a = 7$, $c = 9$

20. $m\angle B = 52°$, $b = 10$

21. $a = 2$, $b = 4$

22. $m\angle A = 37°$, $c = 12$

23. $b = 5$, $c = 8$

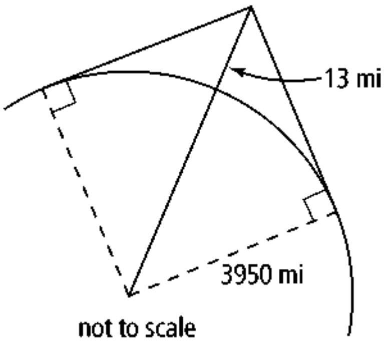
Extra Practice (continued)

Chapter 14

In $\triangle RST$, $\angle S$ is a right angle, $RS = 24$, and $\cos R = \frac{12}{13}$. Draw a diagram and find each value in fraction and decimal form.

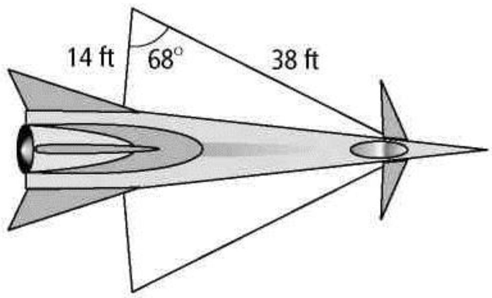
24. $\sin R$ **25.** $\sin T$ **26.** $\cos T$ **27.** $\cot R$

28. A surveillance plane is flying at an altitude of 13 mi. The diagram shows how the visibility from the plane is defined by a circular arc limited by the tangent lines to the surface of Earth. Assume the radius of Earth to be 3950 mi. Use the diagram to find the visibility range (arc length).



29. Two buildings on level ground are 200 feet apart. From the top edge of the shorter building, the angle of elevation to the top of the taller building is 24°, and the angle of depression to the bottom of the taller building is 35°. How tall is each building? Round to the nearest foot.

30. The diagram shows an experimental aircraft with sweptback triangular wings. What is the area of each wing? Round to the nearest tenth of a square foot.

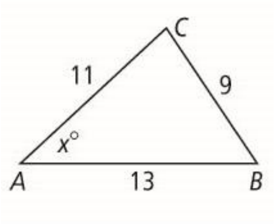


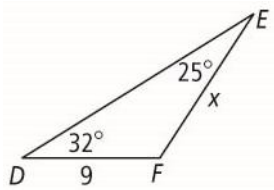
Extra Practice (continued)

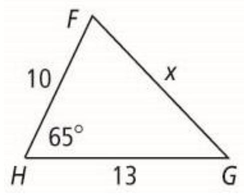
Chapter 14

Lessons 14-4 and 14-5

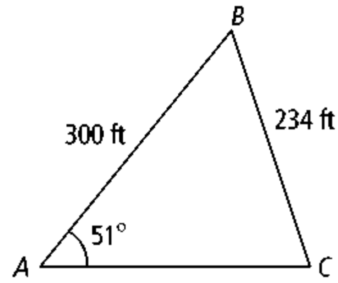
Use the Law of Sines or Law of Cosines. Find the measure *x* to the nearest tenth.

31. 

32. 

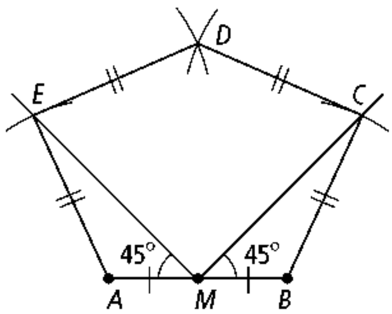
33. 

34. A landscaping company received a rough sketch of a triangular property from the property owner. The sketch, shown at the right, is not to scale. The owner is asking for a price quote to sod the land. Sod costs $2 per square foot. Can the landscaper estimate the cost of the job using the information provided? If so, find the estimate. If not, explain what information is missing



35. Two spotters are observing a hot-air balloon. The spotters are 1.2 mi apart and the balloon is between them. One spotter reports an angle of elevation of 68°, and the other spotter reports an angle of elevation of 84°. What is the altitude of the balloon? Round to the nearest hundredth of a mile.

36. The Cairo tessellation is a tiling pattern that is used for many streets in Cairo, Egypt. The tiling uses identical pentagonal tiles. Each tile has five congruent sides but it is not a regular pentagon. You can construct the Cairo tile as shown in the figure. Start with $\overline{AB}$. Find the midpoint *M* of the segment. Construct lines *ME* and *MC* at 45° to $\overline{AB}$. Use *AB* as a radius to mark of points *E* and *C*. Then use the same radius to mark point *D*. Find the measure of $\angle EAB$ to the nearest tenth of a degree.



37. An entrepreneur wants to develop a property. The map of the property is a quadrilateral with vertices at points (5, 5), (6, 9), (11, 10), and (11, 5). Find the angle measures at each vertex to the nearest tenth of a degree.

Extra Practice (continued)

Chapter 14

Lesson 14-6

Find each exact value. Use a sum or difference identity.

38. cos 15° **39.** sin 15° **40.** tan 315°

41. cos 390° **42.** sin 105° **43.** tan 225°

Lesson 14-7

Use a double- or half-angle identity to find the exact value of each expression.

44. sin 120° **45.** cos 720° **46.** tan 480°

47. cos 180° **48.** sin 180° **49.** cos 480°

50. sin 90° **51.** cos 75° **52.** tan 75°

53. sin 67.5° **54.** tan 67.5° **55.** cos 7.5°

56. Lines ℓ_1 and ℓ_2 pass through the origin and Quadrants I and III. Line ℓ_1 is the bisector of the angle formed by the x-axis and line ℓ_2. Lines ℓ_2 and $x = a$ intersect at (a, b). Lines ℓ_1 and $x = a$ intersect at (a, c). Express c as a function of a and b.