

## Math 150 Week-in-Review 8 Problem Set

(Problem 15 was taken from *Precalculus: Functions and Graphs* by Swokowski/Cole)

- Express  $200^\circ$  in radians.
  - Express  $\frac{5\pi}{4}$  in degrees.
- An arc of length 6 ft subtends a central angle of  $20^\circ$ . What is the radius of this circle?
- In a pizza with diameter 16 in, the area of a certain piece of pizza is  $24 \text{ in}^2$ . What is the length of the crust on this piece of pizza?
- If a record player makes 8 revolutions every 5 seconds, what is the angular speed of the player?
- A car tire has a radius of 12 inches. The tire is rotating at a rate of 700 rpm. What is the speed of the car? (What is the linear speed of the tire?)

6. Find coterminal angles between  $0^\circ$  and  $360^\circ$  or 0 and  $2\pi$  for the following.

(a)  $-680^\circ$

(b)  $\frac{43\pi}{7}$

7. A water slide at a water park forms an angle of elevation of  $10^\circ$  from the water to the top of the slide. The endpoint of the slide is 110 ft horizontally from the start of the slide.

(a) How long is the slide?

(b) How high does the slide start?

8. An ant is sitting between 2 towers. One tower is 100 ft tall and the other is 150 ft tall. The angle of depression from the 100 ft tower to the ant is  $32^\circ$ . The angle of elevation from the ant to the top of the 150 ft tower is  $43^\circ$ . How far apart are the towers?

9. Find the reference angle for the given angle and then evaluate the trig function.

(a)  $\csc(-315^\circ)$

(b)  $\sec \frac{4\pi}{3}$

(c)  $\tan 690^\circ$

10. Given that  $\csc \theta = \frac{7}{4}$  and that  $\cot \theta < 0$ , find the other trig functions for  $\theta$ .

11. Solve the following triangles.

(a)  $A = 90^\circ, B = 15^\circ, c = 4$

(b)  $B = 37^\circ, a = 12, b = 9$

(c)  $A = 15^\circ, C = 110^\circ, b = 10$

(d)  $A = 65^\circ, a = 50, c = 75$

(e)  $a = 9, b = 7, c = 4$

(f)  $C = 77^\circ, a = 5, b = 8$

12. A ski lift takes people to the top of a mountain. The pickup point for the ski lift is 5000 ft from the base of the mountain. The angle of elevation from the pickup point to the top of the mountain is  $22^\circ$  and the angle of elevation from the base of the mountain to the top of the mountain is  $64^\circ$ .

(a) What is the distance the ski lift travels?

(b) What is the vertical height of the mountain?

13. A man goes for a jog. He starts out from his house going due west for 3 miles. He then changes to a direction of N  $12^\circ$  W and jogs in this direction for 5 miles. How far from his house is he at this point?

14. Simplify the following expression completely:  $(\sec u - \tan u)(\csc u + 1)$

15. Verify (prove) the following identities.

(a) 
$$\frac{\tan x}{1 + \sec x} + \frac{1 + \sec x}{\tan x} = 2 \csc x$$

$$(b) \frac{\cot(-t) + \tan(-t)}{\cot t} = -\sec^2 t$$

16. Substitute  $x = 4 \sin \theta$  into the expression  $\frac{x^2}{\sqrt{16 - x^2}}$  and simplify.  
(Assume that  $\theta$  is in Quadrant I.)