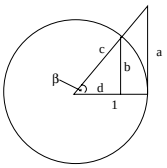
# Week in Review # 9B

MATH 150

6.1 through 6.5 Drost-Fall 2002

19. Express the lengths a, b, c, and d in the figure below in terms of the trigonometric ratios of $\theta$.




20. A rain gutter is to be constructed from a metal sheet of width 30cm by bending up $\frac{1}{3}$ of the sheet on each side through an angle of $\theta$. Find the cross-sectional area as a function of $\theta$.

21. Find the exact value of:

a) $\cos(-60^o)$

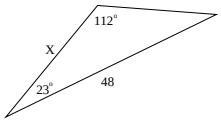
b) $\sec 120^o$

c) $\tan 750^o$

d) $\cos \dfrac{5\pi}{4}$

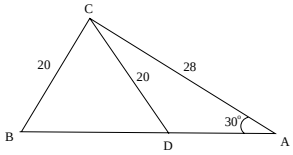
22. Find the quadrant in which $\cos\theta < 0$ and $\tan\theta > 0$.

23. Use the law of sines to find the indicated side x:




24. Solve the $\triangle ABC$, where $A = 30^o, a = 75$, and $b = 100$.

25. For the triangle shown, find a) $\angle BCD$ , and b) $\angle DCA$.




26. An observer at point A sees a weather balloon at an angle $\theta$ of elevation. The balloon (B) is 500' above point C.

a. Express the distance $x$ to the balloon as a function of $\theta$.

b. Find the distance if the angle of elevation is $26^o$.

27. Solve the right triangle ABC given $A = 8.4^o$ and $a = 40.5$.

28. From a point $100'$ in front of a public library, the angle of elevation to the base of the flagpole and the top of the flagpole are $26^o$ and $40^o10'$. The flagpole is mounted on the front of the library's roof. Find the height of the pole.

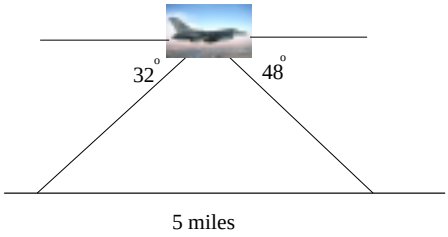
29. A surveyor wishes to find the distance to point B across a lake. The bearing from point A to point B is $N28^oW$. The surveyor then walks on a path with bearing $N62^oE$ a distance of 80 meters to point C. At point C the bearing to point B is $N74^oW$. Find the distance from A to B.

30. One ship leaves port at 9am traveling $N53^oW$ at 10 knots and the other ship leaves an hour later traveling at a bearing of $S67^oW$ at 18 knots. Approximately how far apart are they at noon that day?

31. A pilot is flying over a straight highway. He determines the angles of depression to two mile-posts, 5 miles apart, to be $32^o$ and $48^o$. (Note: one is ahead of the plane, and the other behind)

a) Find the distance of the plane from point A.

b) Find the elevation of the plane.




ANSWERS:

19. $b = \sin\theta, a = \tan\theta, c = \sec\theta, d = \cos\theta$

20. $A(\theta) = 100\sin\theta + 100\sin\theta \cdot \cos\theta$

21. $1/2, -2, \sqrt{3}/3, -\sqrt{2}/2$

22. Quadrant III

23. 36.6

24. Triangle 1: sides 75,100,142.5

angles: $30^o, 41.8^o, 108.2^o$

Triangle 2: sides 75, 100, 30.7

angles: $30^o, 138.2^o, 11.8^o$

25. $\angle BCD = 91.1^o, \angle DCA = 14.4^o$

26. a) $\dfrac{500}{\sin\theta}$, b) 1140.6 ft

27. sides: 40.5, 274.3, 277.2

angles: $8.4^o, 81.6^o, 90^o$

28. $h \approx 35.6$ ft

29. $d \approx 77.3$ meters

30. 33.4 nautical miles

31. a) 3.77 miles

31. b) 2 miles