8.1 Find the \textbf{EXACT} value of each of the following:
1. \( \tan \frac{11\pi}{12} \)
2. \( \cos 165^\circ \)
3. \( \sin 105^\circ \)

Simplify each of the following:
4. \( \sin 28^\circ \cos 7^\circ - \cos 28^\circ \sin 7^\circ \)
5. \( \cos 5^\circ \cos 14^\circ + \sin 5^\circ \sin 14^\circ \)
6. \( \sin \frac{2\pi}{3} \sin \frac{\pi}{4} - \cos \frac{2\pi}{3} \cos \frac{\pi}{4} \)

Verify the following identities:
7. \( \cos (\pi + \theta) = -\cos \theta \)
8. \( \sin (x + \frac{\pi}{2}) = \cos x \)
9. \( \cos (x + y) - \cos (x - y) = -2\sin x \sin y \)
10. If \( \sin u = -\frac{\sqrt{2}}{4} \) for \( u \) in quadrant III and \( \tan v = -\frac{\sqrt{2}}{2} \) for \( v \) in quadrant IV, find \( \sec(u - v) \)

8.2

Given \( \sin \theta = -\frac{4}{8} \) and \( \theta \) is in quadrant III, find
11. \( \sin \frac{\theta}{2} \)
12. \( \cos \frac{\theta}{2} \)
13. \( \tan \frac{\theta}{2} \)

Verify the following identities:
14. \( \tan x = \frac{\sin 2x}{1+\cos 2x} \)
15. \( 1 + \cos 2x = \cot x \cdot \sin 2x \)
16. \( \cos 2x = \frac{1-\tan^2 x}{1+\tan^2 x} \)

Find all solutions over the interval \([0, 2\pi)\)
17. \( \tan 2x = \tan x \)
18. \( \sec x + \tan x = 1 \)

Find the \textbf{EXACT} value of each of the following:
19. \( \sin \frac{\pi}{8} \)
20. \( \cos 67.5^\circ \)

21. Find the length of \( a \) in the following figure:

8.3

22. Solve the triangle \( \triangle ABC \), when \( B = 53^\circ, b = 7, c = 10 \)
23. Solve the triangle \( \triangle ABC \), when \( A = 80^\circ, C = 41^\circ, b = 30 \)
24. Two trains leave a train station at 10am traveling along straight tracks at 120 and 150km/hr, respectively. If the angle between their directions of travel is 118°, how far apart are the trains at 10:40 am?
25. Draw triangle \( \triangle ACD \) with point \( B \) on the side \( AC \). Given \( AB = 4 \) and angle \( A = 30^\circ \), and angle \( ABD = 125^\circ \), and angle \( C = 85^\circ \), find the length of the line segment \( BD \).

26. Estimate the height of the redwood tree in the following figure if the distance from \( Q \) to \( R \), 200 ft., is accurate to the nearest 10 feet.

27. A ship travels from point \( A \) for 2 hours at a speed of 167 km/hr on a course of \( N65^\circ E \) and then changes to a course of \( N15^\circ E \) for 3 hours at the same speed. After the 5 hrs, how far is the ship from point \( A \)?

28. Find the area of the following triangle:

\[ \begin{align*}
&\text{ANSWERS:} \\
1. &\quad \frac{1-\sqrt{3}}{1+\sqrt{3}} \quad \text{or} \quad -2+\sqrt{3} \\
2. &\quad \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \\
3. &\quad \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} \\
4. &\quad \sin 21^\circ \\
5. &\quad \cos 9^\circ \\
6. &\quad -\cos \frac{11\pi}{12} \\
7. &\quad -\cos \theta = -\cos \theta
\end{align*} \]
8. $\cos x = \cos x$

9. $-2 \sin x \sin y = -2 \sin x \sin y$

10. $\frac{\sqrt{210} - 2\sqrt{105}}{-6}$

11. $\frac{2\sqrt{5}}{5}$

12. $\frac{-\sqrt{5}}{5}$

13. $-2$

14. $\tan x = \tan x$

15. $1 + \cos 2x = 1 + \cos 2x$

16. $\cos 2x = \cos 2x$

17. $0, \pi$

18. $0, \pi, \frac{3}{2} \pi$

19. $\frac{\sqrt{2} - \sqrt{2}}{2}$

20. $-\frac{\sqrt{2} - \sqrt{2}}{2}$

21. $3$

22. no triangle exists

23. angle $B = 59^\circ$, $c \approx 23$, $a \approx 35$

24. $155$ km

25. 4.5 units

26. 210 feet

27. 760 km

28. 68.2 sq units

If you spot any MORE typing errors, please email me at: drost@math.tamu.edu