

Math 150 Week in Review 9 Problem Set

(Parts of Problem 11 were taken from *Precalculus: Functions and Graphs* by Swokowski/Cole)

1. Solve the following triangle: $a = 9, b = 7, c = 4$
2. A man goes for a jog. He starts out from his house going N 85° W for 3 miles. He then changes to a direction of N 12° W and jogs in this direction for 5 miles.
 - (a) How far from his house is he at this point?
 - (b) What bearing should he head in to get back to his house?
3. Simplify the following expression completely: $\frac{(\sec u - \tan u)(\csc u + 1)}{\csc u}$
4. Substitute $x = 4 \sin \theta$ into the expression $\frac{x^2}{\sqrt{16 - x^2}}$ and simplify. (Assume that θ is in Quadrant I.)
5. Use Addition or Subtraction Formulas to evaluate the following.
 - (a) $\cos 165^\circ$
 - (b) $\sin(-\frac{5\pi}{12})$
 - (c) $\left(\frac{\tan 62^\circ - \tan 17^\circ}{1 + \tan 62^\circ \tan 17^\circ}\right) (\cos 39^\circ \cos 21^\circ - \sin 39^\circ \sin 21^\circ)$
6. Given that $\csc x = \frac{3}{2}$ and that x is in Quadrant II, find $\sin 2x, \cos 2x,$ and $\tan 2x.$
7. Use a Half-Angle Formula to evaluate $\sin 75^\circ.$
8. Given that $\tan x = \frac{5}{2}$ and that $180^\circ < x < 270^\circ,$ find $\sin \frac{x}{2}, \cos \frac{x}{2},$ and $\tan \frac{x}{2}.$
9. Use a Sum-to-Product Formula to evaluate $\cos 105^\circ + \cos 15^\circ.$
10. Use a Product-to-Sum Formula to evaluate $\sin 172.5^\circ \sin 52.5^\circ.$
11. Verify (prove) the following identities.
 - (a) $\frac{1 + \sec x}{\tan x} - \frac{\tan x}{1 + \sec x} = 2 \cot x$
 - (b) $\frac{\cot(-t) + \tan(-t)}{\tan(\frac{\pi}{2} - t)} = -\sec^2 t$
 - (c) $\tan(\frac{\pi}{2} - u) = \cot u$
 - (d) $\frac{2(\tan x - \cot x)}{\tan^2 x - \cot^2 x} = \sin 2x$
 - (e) $\sin^2 3x \cos^2 3x = \frac{1}{8}(1 - \cos 12x)$
 - (f) $\cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1$
 - (g) $\frac{\sin 12x}{\sin 11x + \sin x} = \frac{\cos 6x}{\cos 5x}$

Not all instructors may have covered the following two questions.

12. Find the area of the triangle with $a = 5, b = 10, c = 7.$
13. Write the following in terms of sine only. $-2 \sin x - 2\sqrt{3} \cos x$