

Show all necessary steps in each problem. Full credit is based on work shown!

1. Use fundamental identities to establish the following identities.

3pts [Hint: substitute & simplify.]

5pts [Hint: substitute & simplify.]

a. $\cos^2 \theta (1 + \tan^2 \theta) = 1$

b. $\frac{\sec \theta}{\csc \theta} + \frac{\sin \theta}{\cos \theta} = 2 \tan \theta$ [8.3 HW # 45]

[8.3 HW #31]

4pts

2. Use the sum and difference identities to write the expression as the sine or cosine of a single angle, then give the exact value of the function. [These are from 8.4, like HW # 21-30.]

a. $\sin 75^\circ \cos 15^\circ - \cos 75^\circ \sin 15^\circ$

b. $\frac{\tan 50^\circ - \tan 20^\circ}{1 + \tan 50^\circ \tan 20^\circ}$

8pts [This is from 8.4, similar to Example 5 and HW # 31-36.]

3. Given that $\sin \alpha = \frac{5}{13}$, where $\frac{\pi}{2} < \alpha < \pi$; and $\tan \beta = -\sqrt{3}$, where $\frac{3\pi}{2} < \beta < 2\pi$

find the exact value of

[Hint: sketch triangles.]

a. $\cos \alpha$

b. $\cos \beta$

c. $\sin \beta$

d. $\cos(\alpha + \beta)$