Kerry Ojakian's MTH 30 Class
Class Assignment #23

1. Use the fundamental identities of trigonometric functions to write the following expressions using only sine and cosine and simplify them as much as possible.

   (a) $\sin x \cos x \sec x$

   $\tan x \sin x + \sec x \cos^2 x$

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2. Use the fundamental identities of trigonometric functions to write the following expressions using only sine and cosine and simplify them as much as possible.

   (a) $\csc x - \cos x \cot x$

   (b) $3 \sin^3 x \csc x + 3 \cos^2 x$

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3. Use the fundamental identities of trigonometric functions to write

$$\frac{1 - \cos^2 x}{\tan^2 x} + \sin^2 x$$

using only sine and cosine and simplify them as much as possible.

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4. Use the fundamental identities of trigonometric functions to write

$$\frac{1+\tan^2 x}{\csc^2 x} + \sin^2 x + \frac{1}{\sec^2 x}$$

using only sine and cosine and simplify them as much as possible.

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5. Show that $\tan(x)\ \csc(x)\ \cos(x) = 1$.

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6. Prove that $\tan(\theta) + \cot(\theta) = \sec(\theta)\ \csc(\theta)$.

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7. Prove that $\dfrac{\tan^2(\theta)+2}{1+\tan^2(\theta)} = 1 + \cos^2(\theta)$.

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8. Prove the following trigonometric identity. $\cos x\,(\tan x - \sec x) = \sin x - 1$

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9. Prove the following trigonometric identity. $\sec^2 x(1 + \cos^2 x) = \tan^2 x$

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10. Prove the following trigonometric identity. $\sin x\,(\cot x + \csc x) = \cos x + 1$

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11. Prove the following trigonometric identity. $\cos^2 x(1 + \tan^2 x) = 1$

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12. Prove the following trigonometric identity. $\sin x \tan x = \sec x - \cos x$

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13. Prove the following trigonometric identity. $\sec x - \cos x = \tan x \sin x$

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14. Prove the following trigonometric identity. $\sec x \csc x = \tan x + \cot x.$

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15. Prove the following trigonometric identity. $\dfrac{\cos x \sec x}{\cot x} = \tan x$
