Happy Tuesday, February 28th

Prove:

$$2(3x^3 - 21x^2 + 12x) = 3x(x-4)(x-3)$$

RHS

$3x(x^2 - 7x + 12)$ FOIL

LHS $\neq$ $(3x^3 - 21x^2 + 36x)$ D

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Proofs are like sandwiches... $\tan x + \cot x = \sec x \csc x$

You know what's on top

...And what's on bottom

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Our Ingredients for Trig Proofs

The meat: ALGEBRA

The Veggies: Definitions

The Sauces: Explanations

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The meat: ALGEBRA

Factoring

Adding/Subtracting Fractions

Distributing

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The Veggies: Definitions/Identities

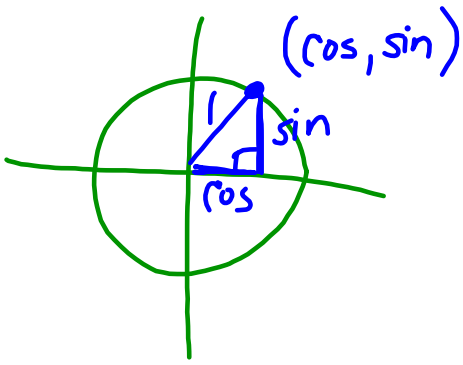
$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\csc\theta = \frac{1}{\sin\theta}$

$\sec\theta = \frac{1}{\cos\theta}$

$\cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta}$

$\sin^2\theta + \cos^2\theta = 1$



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$\frac{\sin^2\theta}{\cos^2\theta} + \frac{\cos^2\theta}{\cos^2\theta} = \frac{1}{\cos^2\theta}$

divide by $\sin^2\theta$ $\Rightarrow$ $1 + \cot^2\theta = \csc^2\theta$

divide by $\cos^2\theta$ $\Rightarrow$ $\tan^2\theta + 1 = \sec^2\theta$

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The Sauces: Explanations

Will not be required on the test, but will be required on homework.

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LHS

$$\tan x + \cot x = \sec x \cdot \csc x$$

By def tan/cot $\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}$ ($\sin x$)($\sin x$)

Common denom. $\frac{\sin x \cdot \sin x}{\sin x \cdot \cos x} + \frac{\cos x \cdot \cos x}{\sin x \cos x}$

Add Fractions $\frac{(\sin^2 x + \cos^2 x)}{\sin x \cos x}$

Pythagorean identity $\frac{1}{\sin x \cdot \cos x}$

Split fraction $\frac{1}{\sin x} \cdot \frac{1}{\cos x}$

$\csc x \cdot \sec x$

$\sec x \cdot \csc x = \sec x \csc x$

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$$(\sin x)(\cot x + \cos x \tan x) = \cos x + \sin^2 x$$

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