

## Sec 7.4 Proving Trig Identities

When working with a proof:

1/ Always work LS and RS separately

(working one or both sides is allowed)

2/ Use ALL algebra skills especially common denominator and factoring

(compare denominators, look for squared terms, etc.)

3/ Replace  $\tan(x)$  whenever possible

( $\tan(x) = \sin(x)/\cos(x)$ )

4/ Use any identities formulas necessary

( $\sin^2(x) + \cos^2(x) = 1$  or variations)

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### Childs' Strategies

1. remove  $\tan(x)$

2. remove double angles if possible

3. count the number of terms

4. check denominators

5. look for what is the same and what is different on both LS and RS

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## Known Identities:

$$\tan x = \frac{\sin x}{\cos x} \quad \text{quotient identity}$$

$$\sin^2 x + \cos^2 x = 1 \quad \text{Pythagorean identity}$$

variations

divide by  $\sin^2 x$

divide by  $\cos^2 x$

Double Angle Identities

see page 416

Sum / Difference Identities

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Prove the following:

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

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Prove the following:

$$\cos\left(\frac{\pi}{2} + x\right) = -\sin x$$

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Prove the following:

$$\tan(2x) - 2 \tan(2x) \sin^2(x) = -\sin(2x)$$

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Prove the identity:

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

1/ substitute in numerator and denominator

$$\cos 2x = 2 \cos^2 x - 1$$

$$\sin 2x = 2 \sin x \cos x$$

2/ factor both numerator and denominator

3/ divide top and bottom by common factor

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Let's work on the homework

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