

HAT  
Proving Trigonometric Identities

5/9/18

EXAMPLE Prove  $\csc x \tan x = \sec x$

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

Pull

$$\frac{1}{\cos x}$$

Pull

$$\sec x$$

Pull

Pull

Rewrite each term in terms of sine and cosine

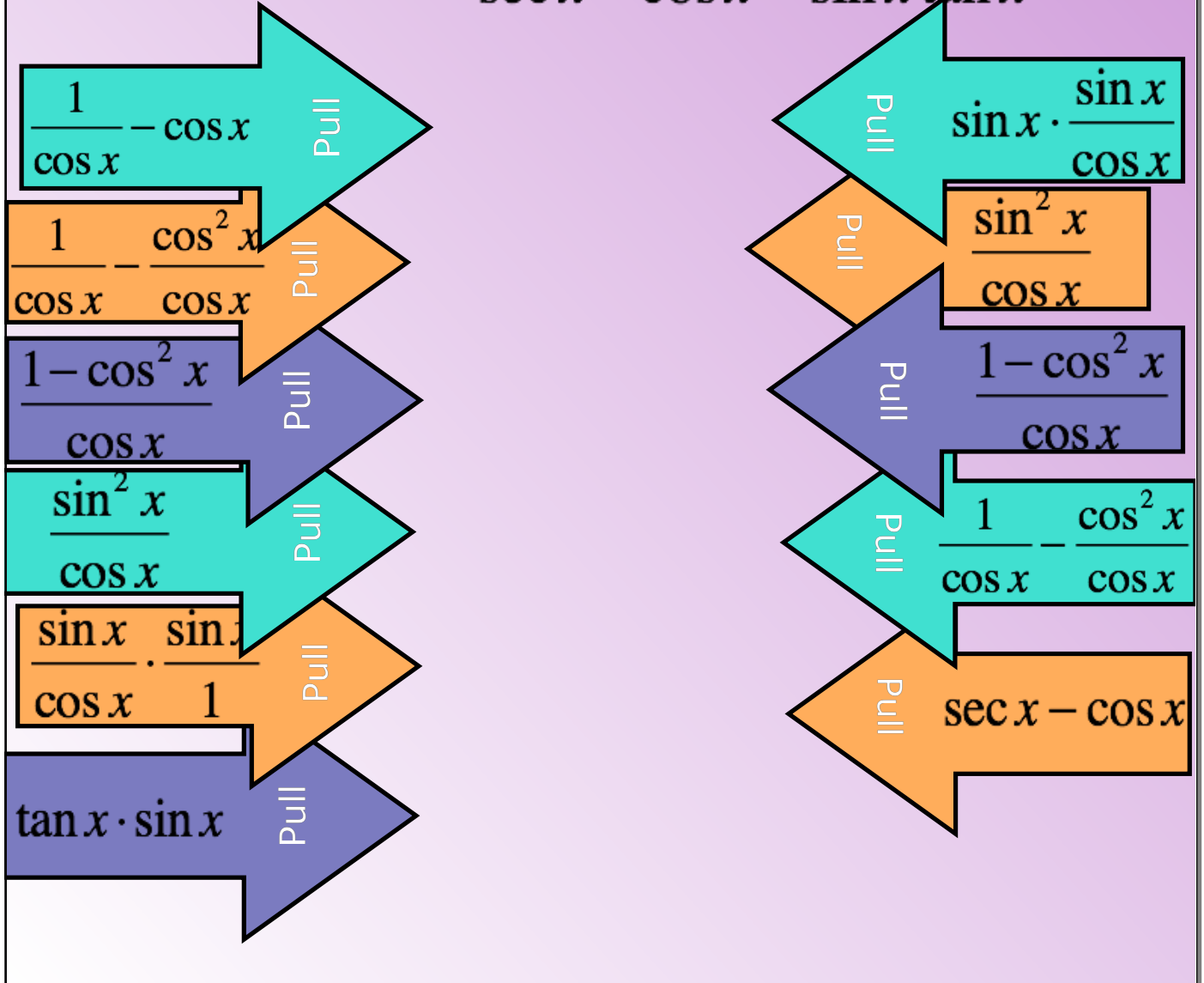
Pull

Simplify.

Pull

LHS is transformed to match RHS

EX2: Prove  $\sec x - \cos x = \sin x \tan x$



EX3: Prove  $\sec x - \frac{\cos x}{1 + \sin x} = \tan x$

$$\frac{1 + \sin x}{1 + \sin x} \cdot \frac{1}{\cos x} - \frac{\cos x}{1 + \sin x} \cdot \frac{\cos x}{\cos x}$$

$$\frac{1 + \sin x - \overset{\sin^2 x}{\cos^2 x}}{\cos x (1 + \sin x)}$$

$$\frac{\sin^2 x + \sin x}{\cos x (1 + \sin x)}$$

$$\frac{\sin x (\cancel{\sin x + 1})}{\cos x (\cancel{1 + \sin x})}$$

$$\tan x$$

Prove this identity  $\frac{\sec \theta \sin \theta}{\tan \theta + \cot \theta} = \sin^2 \theta$

$$\frac{\frac{1}{\cos \theta} \cdot \sin \theta}{\tan \theta + \frac{1}{\tan \theta}} \rightarrow \left( \frac{\tan^2 \theta + 1}{\tan \theta} \right) \rightarrow \tan \theta \cdot \frac{\tan \theta}{\sec^2 \theta}$$

$$\frac{\tan^2 \theta}{\sec^2 \theta} \leftarrow \frac{\sin^2 \theta \cdot \cos^2 \theta}{\cos^2 \theta \cdot 1}$$

$$\sin^2 \theta$$

Assignment: page 883 #21-29

