5.1 Using Fundamental Identities

I. Identies - Page 340

Reciprocal Identies

$$\sin u = \frac{1}{\csc u} \quad \cos u = \frac{1}{\sec u} \quad \tan u = \frac{1}{\cot u}$$

$$\csc u = \frac{1}{\sin u} \quad \sec u = \frac{1}{\cos u} \quad \cot u = \frac{1}{\tan u}$$

Pythagorean Identies

Quotient Identities

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

$$\sin^2 u = 1 - \cos^2 u$$

$$1 + \cot^2 u = \csc^2 u$$

$$1 + \tan^2 u = \sec^2 u$$

$$\tan u = \frac{\sin u}{\cos u} \quad \cot u = \frac{\cos u}{\sin u}$$

Cofunction Identies

$$\sin(\frac{\pi}{2} - u) = \cos u \quad \cos(\frac{\pi}{2} - u) = \sin u \quad \tan(\frac{\pi}{2} - u) = \cot u$$

$$\csc(\frac{\pi}{2} - u) = \sec u \quad \sec(\frac{\pi}{2} - u) = \csc u \quad \cot(\frac{\pi}{2} - u) = \tan u$$

Even/Odd Identies

$$\sin(-x) = -\sin x \quad \csc(-x) = -\csc x$$
$$\cos(-x) = \cos x \quad \sec(-x) = \sec x$$
$$\tan(-x) = -\tan x \quad \cot(-x) = -\cot x$$

II. Simplifying

Ex1) $\dfrac{\text{sinxcos}^2\text{x} - \text{sinx}}{\text{sinx}} \quad \dfrac{}{\text{sinx}}$

$\sin x (\cos^2 x - 1)$

$-\sin x (1 - \cos^2 x)$

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

$\boxed{- \sin^3 x}$

Ex2) $\sin t + \cot t \cos t$

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

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

Ex3) $\dfrac{\tan x \ \csc x}{\csc^2 x} = \dfrac{\tan x}{\csc x} = \dfrac{\dfrac{\sin x}{\cos x} \cdot \sin x}{\dfrac{1}{\sin x} \cdot \sin x}$

$\boxed{\tan x \ \sin x}$

Ex4) $\dfrac{\cos x}{1 - \sin x} - \dfrac{\sin x}{\cos x}$

HW #1 Evaluate all 6 trig functions

$\sin x = \dfrac{\sqrt{3}}{2}$ $\cos x = \dfrac{1}{2}$

HW #15 match trig expression

sec x cos x

a) sec x
b) -1
c) cot x
d) 1
e) -tanx
f) sin x

6.) Simplify $\dfrac{\sec\theta}{\sin^2\theta + \csc\theta + \cos^2\theta - 1}$

$\dfrac{\sec\theta}{1 + \csc\theta - 1} = \dfrac{\sec\theta}{\csc\theta}$