HW: Sec 5.1
30, 32, 34, 37, 38, 40, 42, 52-62 even

Notes Section 5.1

In class #27, 31, 33, 43, 51, 53, 55, 57, 59

Simplify

27) $\sin x(\tan x + \cot x)$

- $\sin x \tan x + \sin x \cot x$ — distr.
- $\sin x \cdot \frac{\sin x}{\cos x} + \sin x \cdot \frac{\cos x}{\sin x}$ — sin/cos
- $\frac{\sin^2 x}{\cos x} + \frac{\sin x \cos x}{\sin x}$ — common Den
- $\frac{\sin^3 x + \sin x \cdot \cos^2 x}{\cos x \sin x}$
- $\frac{\sin x (\sin^2 x + \cos^2 x)^{=1}}{\cos x \sin x}$ — factor GCF
- $\frac{\cancel{\sin x}}{\cos x \cancel{\sin x}}$ — Pyth. ID
- $\frac{1}{\cos x} = \boxed{\sec x}$ — Recip. ID

31) $\frac{\tan x}{\csc^2 x} + \frac{\tan x}{\sec^2 x}$

- $\frac{\frac{\sin x}{\cos x}}{\frac{1}{\sin^2 x}} + \frac{\frac{\sin x}{\cos x}}{\frac{1}{\cos^2 x}}$
- $\frac{\sin x}{\cos x} \cdot \frac{\sin^2 x}{1} + \frac{\sin x}{\cos x} \cdot \cos^2 x$
- $\frac{\sin^3 x + \sin x \cos^2 x}{\cos x}$
- $\frac{\sin x (\sin^2 x + \cos^2 x)^{=1}}{\cos x}$
- $\frac{\sin x}{\cos x} = \boxed{\tan x}$

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

- $\frac{\tan^2 x + \sec^2 x \sin^2 x}{\sin^2 x \tan^2 x}$ — common den.
- $\frac{\frac{\sin^2 x}{\cos^2 x} + \frac{\sin^2 x}{\cos^2 x}}{\sin^2 x \tan^2 x}$ — sin/cos, Quotient ID
- $\frac{2\cancel{\tan^2 x}}{\sin^2 x \cancel{\tan^2 x}} = \frac{2}{\sin^2 x} = \boxed{2\csc^2 x}$ — Recip ID

Factor

43) $\cos x - 2\sin^2 x + 1$ * need all sine or all cosine

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

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

$2\cos^2 x + \cos x - 1$ → $2x^2 + x - 1$

$(2\cos x - 1)(\cos x + 1)$ $(2x-1)(x+1)$

Solve for $[0, 2\pi)$ = give all angles betw. 0 & 2π

51) $2\cos x \sin x - \cos x = 0$

factor GCF $\cos x (2\sin x - 1) = 0$

$\cos x = 0$ $2\sin x - 1 = 0$

$x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\sin x = \frac{1}{2}$ QI, II

$x = \frac{\pi}{6}, \frac{5\pi}{6}$

53) $\tan x \sin^2 x = \tan x$ * DO NOT Divide by a trig. fnc.!! subtract & factor!

$\tan x \sin^2 x - \tan x = 0$

$\tan x (\sin^2 x - 1) = 0$

$\tan x = 0$ $\sin^2 x - 1 = 0$ or $(\sin x - 1)(\sin x + 1)$

$x = 0, \pi$ $\sin^2 x = 1$ $\sin x = 1$ $\sin x = -1$

$\sin x = \pm 1$

$x = \frac{\pi}{2}, \frac{3\pi}{2}$

55) $\sqrt{\tan^2 x} = \sqrt{3}$

$\tan x = \pm\sqrt{3}$

$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

Solve - ALL solutions (+ $2\pi n$ to solutions)

57) $4\cos^2 x - 4\cos x + 1 = 0$

$(2\cos x - 1)(2\cos x - 1) = 0$

$\cos x = \frac{1}{2}$

QI $\frac{\pi}{3} + 2\pi n$

QIV $\frac{5\pi}{3} + 2\pi n$

59) $\sin^2\theta - 2\sin\theta = 0$

$\sin\theta(\sin\theta - 2) = 0$

$\sin\theta = 0$ $\quad$ $\sin\theta = 2$

$\theta = 0 + 2\pi n$

$\theta = \pi + 2\pi n$

no soln.