Cornell Notes	Topic/Objective: TRIG IDENTITIES	Name:
AVID Decades of College Dreams		Class/Period: 4
		Date: 5/17/17

Essential Question: How do we use Trig Identities to solve equations or prove other identities?

Questions:

Notes: (first, finish Tuesday's example)

Ex) Solve $2\sin^2 x + 5\sin x - 3 = 0$ $\quad 0 \le x \le 2\pi$

x (angle)

u substitution

let $u = \sin x$ $\quad$ Quadratic in Form

$2u^2 + 5u - 3 = 0$

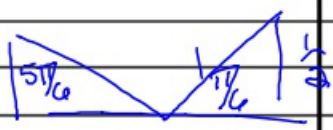
$(2u - 1)(u + 3) = 0$

$2u - 1 = 0$ or $u = -3$

$2u = 1$ $\quad \sin x = -3$ not possible

$u = 1/2$

$\sin x = 1/2$ $\quad$ *$\sin(x) \le |1|$, $\cos(x) \le |1|$



$x = \pi/6, 5\pi/6$

TRIG IDENTITIES

① RECIPROCAL IDENTITIES

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

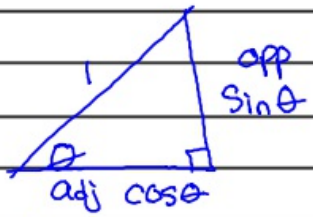
$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{x}$ $\quad \cos\theta = \frac{1}{\sec\theta}$

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

Questions:	Notes:

② Pythagorean Identities (3)

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



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

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

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

$\tan^2\theta = \sec^2\theta - 1$

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

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

$\cot^2\theta = \csc^2\theta - 1$

③ Double Angle Identities

p. 457

Cosine

$\cos(2\theta) = 1 - 2\sin^2\theta$

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

$= \cos^2\theta - \sin^2\theta$

Sine

$\sin(2\theta) = 2\sin\theta\cos\theta$

4. Sum & difference formulas

don't know it you need

$\sin(a+b) = \sin a\cos b + \cos a\sin b$

$\cos(a \pm b) = \cos a\cos b - \sin a\sin b$

Questions:	Notes:

Ex) If $\sin x = \frac{3}{4}$ and $0° \le x \le 90°$

Find

a) $\cos x$ b) $\sin(2x)$ c) $\cos(2x)$ d) $\tan(2x)$

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

$(\frac{3}{4})^2 + \cos^2 x = 1$

$\cos x = \sqrt{1 - (\frac{3}{4})^2}$

$= \sqrt{1 - \frac{9}{16}} = \sqrt{\frac{16}{16} - \frac{9}{16}}$

$\cos x = \sqrt{\frac{7}{16}} = \frac{\sqrt{7}}{4}$

b) $\sin(2x) = 2\sin x \cos x$

$= 2\left(\frac{3}{4}\right)\left(\frac{\sqrt{7}}{4}\right) = \frac{6\sqrt{7}}{16} = \frac{3\sqrt{7}}{8}$

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

$= 1 - 2(3/4)^2$

Algebra Happens

$= -1/8$

d) $\tan(2x) = \dfrac{\frac{3\sqrt{7}}{8} \cdot \frac{-8}{1}}{\frac{-1}{8} \cdot \frac{-8}{1}} = -3\sqrt{7}$

HW 13E p. 460 1, 4, 5, 6