

Solving Trig Equations (6.4) p320 day 7

take up quiz 9

Quiz 9C

1. Simplify to a single ratio.  
 $\frac{2\cos^2 \theta - 1}{\sin \theta} = \frac{2\cos^2 \theta - 1}{\sin \theta}$   
 $\frac{2\cos^2 \theta - 1}{\sin \theta} = \frac{2\cos^2 \theta - 1}{\sin \theta}$   
 $\frac{2\cos^2 \theta - 1}{\sin \theta} = \frac{2\cos^2 \theta - 1}{\sin \theta}$

2. Write as a single expression with one angle.  
 $\frac{1}{2} \cos \frac{\pi}{4} - \cos \frac{3\pi}{4} \sin \frac{\pi}{3}$   
 $\frac{1}{2} \cos \frac{\pi}{4} - \cos \frac{3\pi}{4} \sin \frac{\pi}{3}$   
 $\frac{1}{2} \cos \frac{\pi}{4} - \cos \frac{3\pi}{4} \sin \frac{\pi}{3}$

3. Test using  $\theta = 30^\circ$  to see if this might be an identity. Use exact values.  
 $\cos \theta + 1 = \cos \theta$   
 $\cos \theta + 1 = \cos \theta$   
 $\cos \theta + 1 = \cos \theta$

4. The table shows the average monthly temperatures for Winnipeg, January = 1. Write the equation to model the temperature.  

Month	Temp
Jan	-18.5
Feb	-12.7
Mar	-5.8
Apr	5
May	11.3
Jun	17.5
Jul	19.7
Aug	18
Sep	12.5
Oct	4.5
Nov	-4.3
Dec	-11.7


5. Factor  $2x^2 - 5x - 3$   
 $2x^2 - 5x - 3 = (2x + 1)(x - 3)$

6. Solve  $\sqrt{x+5} = x+3$   
 $\sqrt{x+5} = x+3$   
 $\sqrt{x+5} = x+3$

7. Solve  $2 \sin \theta - 1 = 0$  on the interval  $[0, 2\pi)$   
 $2 \sin \theta - 1 = 0$   
 $2 \sin \theta - 1 = 0$

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How can an orange be as big as the sun?



topology

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#W: 0314#11a1  
p306#4

11. Prove each identity.

a)  $\frac{\sin 2x}{\cos x} + \frac{\cos 2x}{\sin x} = \csc x$   
 $\frac{\sin 2x}{\cos x} + \frac{\cos 2x}{\sin x} = \csc x$   
 $\frac{\sin 2x}{\cos x} + \frac{\cos 2x}{\sin x} = \csc x$

b)  $\csc^2 x + \sec^2 x = \csc^2 x \sec^2 x$   
 $\csc^2 x + \sec^2 x = \csc^2 x \sec^2 x$   
 $\csc^2 x + \sec^2 x = \csc^2 x \sec^2 x$

Asst 4 due Monday

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ex1: Solve  $\sin^2 x + 2 \cos x + 2 = 0$  on  $[0, 2\pi)$

$1 - \cos^2 x + 2 \cos x + 2 = 0$   
 $1 - \cos^2 x + 2 \cos x + 2 = 0$   
 $1 - \cos^2 x + 2 \cos x + 2 = 0$

$\cos x = 3$  no soln  
 $\cos x = -1$   
 $x = \pi$

1ab

1b)  $\sin 2x - \sin x = 0$   
 $2 \sin x \cos x - \sin x = 0$   
 $\sin x (2 \cos x - 1) = 0$   
 $\sin x = 0$   
 $0, \pi$   
 $2 \cos x = 1$   
 $\cos x = \frac{1}{2}$   
 $\frac{\pi}{3}, \frac{5\pi}{3}$

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ex2: Solve  $\cos^2 x = \cot x \sin x$  on  $[0, 2\pi)$

$\cos^2 x = \frac{\cos x}{\sin x} \sin x$   
 $\cos^2 x = \cos x$   
 $\cos^2 x - \cos x = 0$   
 $\cos x (\cos x - 1) = 0$   
 $\cos x = 0$   
 $x = \frac{\pi}{2}, \frac{3\pi}{2}$   
 $\cos x = 1$   
 $x = 0$   
 $x = 2\pi$

restrictions!  
 $\sin x \neq 0$   
 when there is a denominator can't = 0

2bd

## Solving Trig Equations (6.4)

ex3: Solve  $\sin 2x = \sqrt{2} \cos x$   $x \in \mathbb{R}$ 

$$2 \sin x \cos x = \sqrt{2} \cos x$$

$$2 \sin x \cos x - \sqrt{2} \cos x = 0$$

$$\cos x (2 \sin x - \sqrt{2}) = 0$$

$$\cos x = 0$$

$$\sin x = \frac{\sqrt{2}}{2}$$

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

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

$$x = \frac{\pi}{2} + n\pi$$

$$x = \frac{\pi}{4} + 2n\pi$$

$$x = \frac{3\pi}{4} + 2n\pi$$

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$$8. \sin^2 x = \cos^2 x + 1 \quad \sin^2 x = 1 + \sin^2 x + 1$$

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

$$0 = 2 \cos^2 x$$

$$0 = \cos^2 x$$

$$0 = \cos x$$

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

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

$$\sin^2 x = 1$$

$$\sin x = \pm 1$$

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

## Solving Trig Equations (6.4)

p320

day 7

#W: p320#2c, 3bc

assignment due Monday

$$2c) \tan x \cos x \sin x - 1 = 0 \quad [0, 360^\circ)$$

$$\frac{\sin x \cos x \sin x}{\cos x} - 1 = 0$$

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

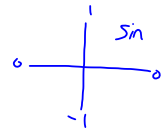
$$\sin^2 x = 1$$

$$\sin x = \pm 1$$

$$x = 90^\circ, 270^\circ$$

$$\cos 90^\circ = 0$$

$$\cos 270^\circ = 0$$

 $\cos x \neq 0$ 

$$3.b) 2 \cos^2 x - 3 \sin x - 3 = 0 \quad [0, 2\pi)$$

$$2(1 - \sin^2 x) - 3 \sin x - 3 = 0$$

$$2 - 2 \sin^2 x - 3 \sin x - 3 = 0$$

$$-2 \sin^2 x - 3 \sin x - 1 = 0$$

$$2 \sin^2 x + 3 \sin x + 1 = 0$$

$$2 \sin^2 x + 2 \sin x + \sin x + 1 = 0$$

$$2 \sin x (\sin x + 1) + 1 (\sin x + 1) = 0$$

$$(2 \sin x + 1)(\sin x + 1) = 0$$

$$\sin x = -\frac{1}{2}$$

$$\sin x = -1$$

$$x = \frac{7\pi}{6}, \frac{11\pi}{6}$$

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

$$3.c) 3 \csc x - \sin x = 2 \quad [0, 2\pi)$$

$$\frac{3}{\sin x} - \sin x = 2$$

$$3 - \sin^2 x = 2 \sin x$$

$$0 = \sin^2 x + 2 \sin x - 3$$

$$0 = (\sin x + 3)(\sin x - 1)$$

$$\therefore \sin x = -3$$

$$\sin x = 1$$

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