

# Cornell Notes

Name Paola Ramirez / Bonn

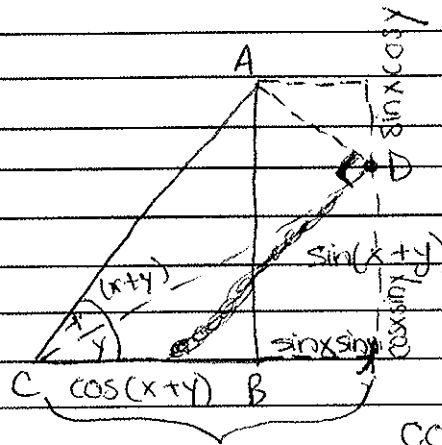
Date 10/31/11

Topic Trig Sum and Difference

Class/Subject Pre-Calc P.5

12:49

1) Finish Quiz from Friday (10 mins)



$$\sin(x+y) = \sin x \cos y + \cos x \sin y$$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$

$$\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$$

Find the exact value

$$\begin{aligned} \textcircled{1} \cos 75^\circ &= \cos(45^\circ + 30^\circ) \\ &= \cos 45^\circ \cos 30^\circ - \sin 45^\circ \sin 30^\circ \\ &= \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right) \\ &= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6} - \sqrt{2}}{4} \\ &= \frac{\sqrt{2}}{4}(\sqrt{3} - 1) \end{aligned}$$

$$\begin{aligned} \textcircled{2} \sin \frac{\pi}{12} &= \sin\left(\frac{4\pi}{12} - \frac{3\pi}{12}\right) \\ &= \sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right) \\ &= \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{2}\right) = \frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} = \frac{\sqrt{2} - \sqrt{6}}{4} \end{aligned}$$

Know  $\sin(x \pm y)$ ,  $\cos(x \pm y)$ , and  $\tan(x \pm y)$ . You cannot use  $\frac{\pi}{2}$  as your  $x$  or  $y$ !

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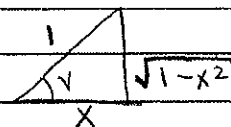
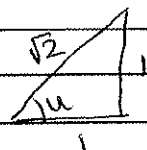
Topic Trig Sum + Difference

Class/Subject Pre-Calc. P.5

$$\begin{aligned}
 (3) \quad & \sin 42^\circ \cos 12^\circ - \cos 42^\circ \sin 12^\circ \\
 & = \sin(x-y) \\
 & = \sin(42^\circ - 12^\circ) \\
 & = \sin 30^\circ \\
 & = \frac{1}{2}
 \end{aligned}$$

Write  $\cos(\arctan 1 + \arccos x)$  as an alg. expression

$$\begin{aligned}
 \cos(u+v) &= \cos u \cos v - \sin u \sin v \\
 \tan(u) &= (\arctan 1) \quad v = \arccos x \\
 \tan u &= 1 \quad \cos v = x
 \end{aligned}$$



$$\begin{aligned}
 \cos(u+v) &= \left(\frac{1}{\sqrt{2}}\right)\left(\frac{x}{1}\right) - \left(\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{1-x^2}}{1}\right) \\
 &= \frac{x - \sqrt{1-x^2}}{\sqrt{2}}
 \end{aligned}$$

(4) Simplify

$$\begin{aligned}
 \cos\left(\theta - \frac{3\pi}{2}\right) &= \cos \theta \cos \frac{3\pi}{2} + \sin \theta \sin \frac{3\pi}{2} \\
 &= \cos \theta \cos \frac{3\pi}{2} + \sin \theta \sin \frac{3\pi}{2} \\
 &= 0(\cos \theta) + \sin \theta(-1) \\
 &= -\sin \theta
 \end{aligned}$$

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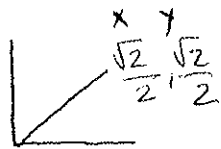
Topic Sum + Difference Formula

Class/Subject Precalc P.5

More examples

$$\begin{aligned} 5) \sec\left(\frac{19\pi}{12}\right) &= \sec\left(\frac{9\pi}{12} + \frac{10\pi}{12}\right) \\ &= \sec\left(\frac{3\pi}{4} + \frac{5\pi}{6}\right) \\ &= \frac{1}{\cos\left(\frac{3\pi}{4} + \frac{5\pi}{6}\right)} \end{aligned}$$

$$\begin{aligned} 6) \tan(\theta + 3\pi) &= \frac{\tan\theta + \tan 3\pi}{1 - \tan\theta \tan 3\pi} \\ &= \frac{\tan\theta + \tan 3\pi}{1 - \tan\theta \tan 3\pi} \\ &= \frac{\tan\theta + \tan \pi}{1 - \tan\theta \tan \pi} \\ &= \frac{\tan\theta + 0}{1 - \tan\theta(0)} = \tan\theta \end{aligned}$$



1:39.

Solve:

$$\begin{aligned} \sin\left(x + \frac{\pi}{4}\right) + \sin\left(x - \frac{\pi}{4}\right) &= -1 \\ \left(\sin x \cos \frac{\pi}{4} + \cos x \sin \frac{\pi}{4}\right) &+ \left(\sin x \cos \frac{\pi}{4} - \cos x \sin \frac{\pi}{4}\right) = -1 \\ \cancel{\sin x \cos \frac{\pi}{4}} + \cancel{\cos x \sin \frac{\pi}{4}} &+ \cancel{\sin x \cos \frac{\pi}{4}} - \cancel{\cos x \sin \frac{\pi}{4}} = -1 \\ 2 \sin x \cos \frac{\pi}{4} &= -1 \\ \cancel{2} \sin x \frac{\sqrt{2}}{2} &= \frac{-1}{\cancel{2} \frac{\sqrt{2}}{2}} \\ \sin x &= \frac{-1}{\sqrt{2}} \end{aligned}$$

$$x = \frac{5\pi}{4}, \frac{7\pi}{4}$$

\*HW: Finish WS (11-1)\*

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Name

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Topic

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Subject

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**Simplify, but do *not* evaluate, the expression**

13.  $\sin 20^\circ \cos 50^\circ + \cos 20^\circ \sin 50^\circ$

14.  $\cos \frac{\pi}{4} \cos \frac{\pi}{3} - \sin \frac{\pi}{4} \sin \frac{\pi}{3}$

15.  $\frac{\tan 68^\circ - \tan 54^\circ}{1 + \tan 68^\circ \tan 54^\circ}$

16.  $\frac{1 - \tan \frac{5\pi}{3} \tan \frac{\pi}{4}}{\tan \frac{5\pi}{3} + \tan \frac{\pi}{4}}$



Name:

Period:

Date:

**Practice Worksheet:**  
**Using Sum & Difference Identities**

Find the exact value of the expression.

1.  $\cos 105^\circ =$

2.  $\sin 195^\circ =$

3.  $\tan 165^\circ =$

4.  $\tan \frac{\pi}{12} =$

5.  $\sec \frac{15\pi}{12} =$

6.  $\sin \frac{13\pi}{12} =$

Evaluate the expression given  $\cos u = \frac{4}{5}$  with  $0 < u < \frac{\pi}{2}$  and  $\tan v = \frac{8}{15}$  with  $\pi < v < \frac{3\pi}{2}$ .

HINT: find  $\sin(u)$ ,  $\tan(u)$ ,  $\sin(v)$ , and  $\cos(v)$  first!

7.  $\sin(u + v)$

10.  $\sin(u - v)$

8.  $\cos(u + v)$

11.  $\cos(u - v)$

9.  $\tan(u + v)$

12.  $\tan(u - v)$