Addition & Subtraction Identities

Dec 28-7:46 PM

7.2 Addition & Subtraction Identities

GrHW#11 Due Thursday

PreCalc

Unit 7 Day 1

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

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

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

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

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

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

You must have these memorized ! ! !

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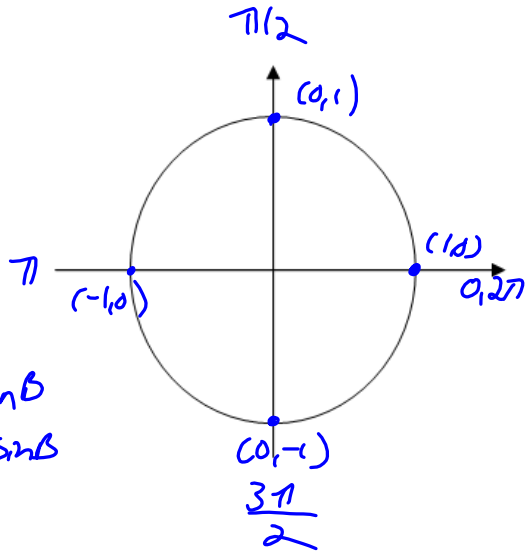
Simplify each using the formula:



1. $\cos(\pi - x)$ (-1,0)
$= \cos\pi\cos x + \sin\pi\sin x$
$= (-1)\cos x + 0(\sin x)$
$= -\cos x$

2. $\sin\left(\frac{\pi}{2} - \beta\right) = \sin\frac{\pi}{2}\cos\beta - \cos\frac{\pi}{2}\sin\beta$
$= (1)\cos\beta - (0)\sin\beta$
$= \cos\beta$

3. $\sin(\pi + \alpha) = \sin\pi\cos\alpha + \cos\pi\sin\alpha$
(-1,0) $= (0)\cos\alpha + (-1)\sin\alpha$
$= -\sin\alpha$

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Rewrite as a trigonometric function of a single angle, then evaluate:

4. $\cos\left(\frac{7\pi}{18}\right)\cos\left(\frac{2\pi}{9}\right) + \sin\left(\frac{7\pi}{18}\right)\sin\left(\frac{2\pi}{9}\right) = \cos\left(\frac{7\pi}{18} - \frac{2\pi}{9}\right) = \cos\left(\frac{7\pi}{18} - \frac{4\pi}{18}\right)$
$= \cos\left(\frac{3\pi}{18}\right) = \cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$
π/6 π/4 π/3
Sin
Cos
tan
II

5. $\frac{\tan\left(\frac{5\pi}{9}\right) + \tan\left(\frac{\pi}{9}\right)}{1 - \tan\left(\frac{5\pi}{9}\right)\tan\left(\frac{\pi}{9}\right)} = \tan\left(\frac{5\pi}{9} + \frac{\pi}{9}\right) = \tan\left(\frac{6\pi}{9}\right) = \tan\left(\frac{2\pi}{3}\right)$
$= -\sqrt{3}$
π/6 π/4 π/3
S
C
tan

6. $\sin\left(\frac{10\pi}{9}\right)\cos\left(\frac{\pi}{6}\right) - \cos\left(\frac{10\pi}{9}\right)\sin\left(\frac{\pi}{6}\right) = \sin\left(\frac{2\pi}{3} - \frac{\pi}{6}\right) = \sin\left(\frac{4\pi}{6} - \frac{\pi}{6}\right)$
2π/3 2π/3 1/2
$= \sin\left(\frac{3\pi}{6}\right) = \sin\frac{\pi}{2} = 1$

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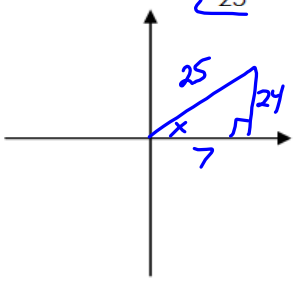
3-4-5, 5-12-13, 8-15-17, 7-24-25

7. Find the exact values of the following if x is in quadrant I and y is in quadrant II, $\sin x = \frac{24}{25}$ and $\sin y = \frac{4}{5}$

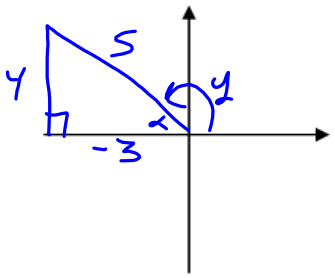


a) $\sin(x+y) = \sin x \cos y + \cos x \sin y$

$= \left(\frac{24}{25}\right)\left(-\frac{3}{5}\right) + \left(\frac{7}{25}\right)\left(\frac{4}{5}\right)$

$= \frac{-72}{125} + \frac{28}{125}$

$= \frac{-44}{125}$



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

$= \left(\frac{24}{25}\right)\left(-\frac{3}{5}\right) - \left(\frac{7}{25}\right)\left(\frac{4}{5}\right)$

$= \frac{-72}{125} - \frac{28}{125} = \frac{-100}{125} = \frac{-4}{5}$

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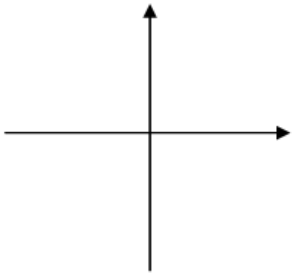
c) $\cos(x+y) = \cos x \cos y - \sin x \sin y$

$= \left(\frac{7}{25}\right)\left(-\frac{3}{5}\right) - \left(\frac{24}{25}\right)\left(\frac{4}{5}\right)$

$= \frac{-21}{125} - \frac{96}{125} = \frac{-117}{125}$



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

$= \frac{-21}{125} + \frac{96}{125} = \frac{75}{125} = \frac{3}{5}$

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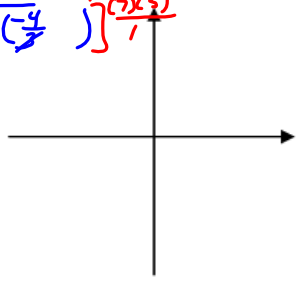
e) $\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y} = \frac{\left[\left(\frac{24}{7}\right) + \left(\frac{-4}{3}\right)\right]\frac{7\cdot3}{1}}{\left[1 - \left(\frac{24}{7}\right)\left(\frac{-4}{3}\right)\right]\frac{7\cdot3}{1}}$

24
3
6 12
-28

$= \frac{72-28}{21+96} = \frac{44}{117}$



add f) $\frac{\sin(x+y)}{\cos(x+y)} = \tan(x+y) = \frac{44}{117}$

Jan 3-10:13 AM

Homework 7-1: Wkst 7A

Graded Due Thursday

$-xy - xy = -2xy$

8) $\cos(\alpha+\beta) - \cos(\alpha-\beta)$

$= \cos\alpha\cos\beta - \sin\alpha\sin\beta - [\cos\alpha\cos\beta + \sin\alpha\sin\beta]$

$= \cos\alpha\cos\beta - \sin\alpha\sin\beta - \cos\alpha\cos\beta - \sin\alpha\sin\beta$

$= -2\sin\alpha\sin\beta$

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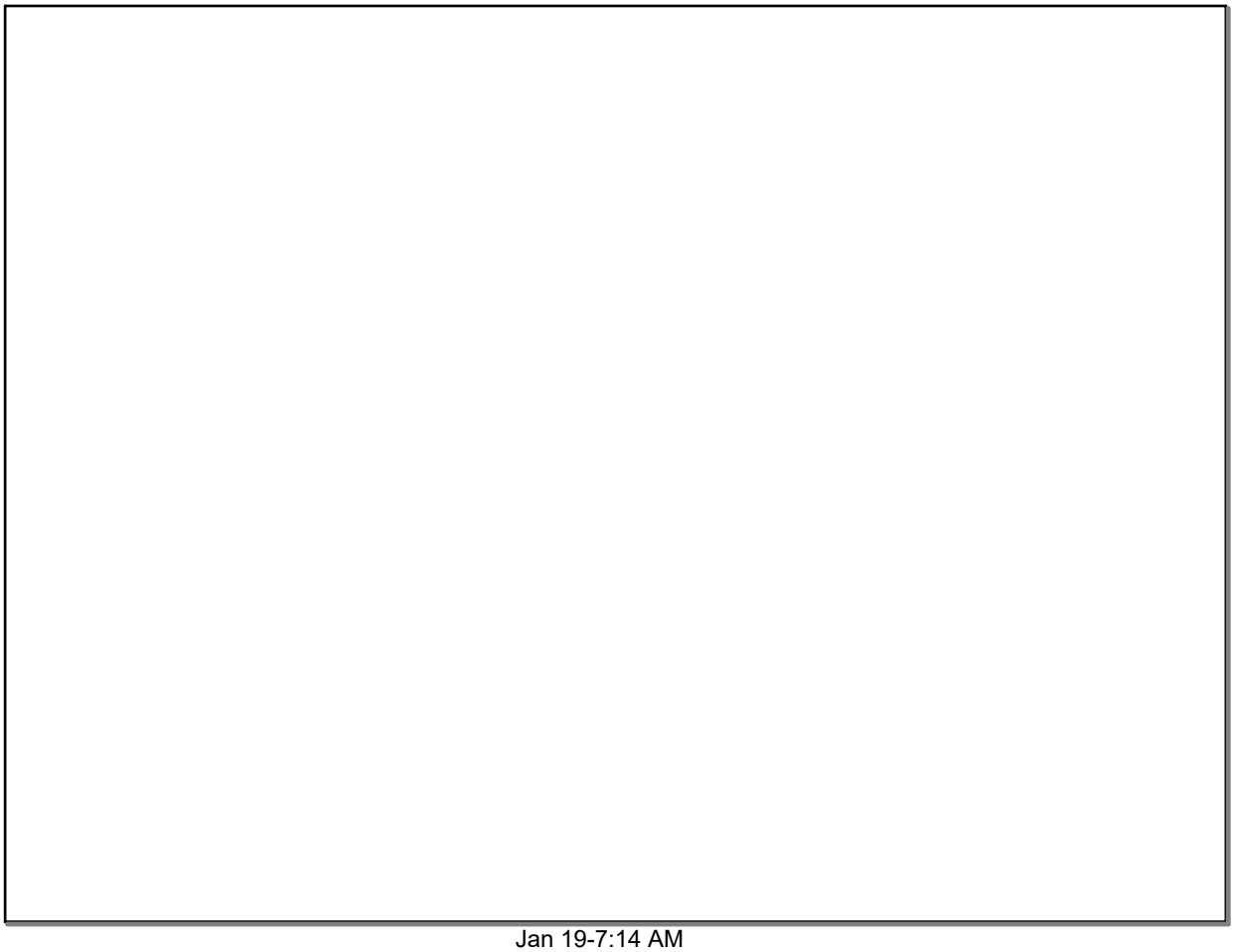

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