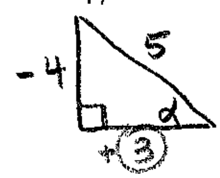
GSE PreCalculus: Unit 5: Trig Identities
Test 5A Review

Name ____________________
Date ____________________ Day ____

Given that α and β **are in quadrant 4 and** $\sin\alpha = -\frac{4}{5}$ and $\cos\beta = \frac{15}{17}$, **find:**



1. $\cos(\alpha)$ $\frac{3}{5}$

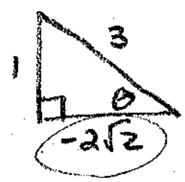
2. $\sin(\beta)$ $-\frac{8}{17}$

3. $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta = (-4/5)(15/17) + (3/5)(-8/17) = -\frac{84}{85}$
   $\csc(\alpha+\beta) = -85/84$

4. $\cos(\alpha-\beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta = (3/5)(15/17) + (-4/5)(-8/17) = \frac{77}{85}$
   $\sec(\alpha-\beta) = 85/77$

5. $\cot(\alpha-\beta) \longrightarrow$ Find $\tan(\alpha-\beta)$ and flip it
   $\frac{\tan\alpha - \tan\beta}{1+\tan\alpha\tan\beta} = \frac{-4/3 + 8/15}{1+(-4/3)(-8/15)} = \frac{-4/5}{77/45} = -4/5 \cdot 45/77 = -\frac{36}{77} = \tan \Rightarrow -\frac{77}{36}$ cot

6. If $\sin\theta = \frac{1}{3}$ and $90° < \theta < 180°$, then find the value of $\sec\theta$



$\cos\theta = \frac{-2\sqrt{2}}{3}$

$\sec\theta = -\frac{3}{2\sqrt{2}}$

$a^2+1^2=3^2$
$a^2+1=9$
$a^2=8$
$a=2\sqrt{2}$

Use sum/difference formulas to find the exact value of the following:

1. $\sin 60° = \sin(90° - 30°) = \sin 90\cos 30 - \cos 90\sin 30$
   $(1)(\sqrt{3}/2) - (0)(1/2)$ $\frac{\sqrt{3}}{2}$

2. $\cos 75° = \cos(120° - 45°) = \cos 120\cos 45 + \sin 120\sin 45$
   $(-1/2)(\sqrt{2}/2) + (\sqrt{3}/2)(\sqrt{2}/2)$ $\frac{\sqrt{6}-\sqrt{2}}{4}$
   $-\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4}$

Write as the sin, cos, or tan of a single angle.

1. $\sin 70°\cos 40° - \cos 70°\sin 40°$ $\sin(70-40) = \sin 30$

2. $\cos 210°\cos 80° + \sin 210°\sin 80°$ $\cos(210-80) = \cos 130$

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Verify the following.

1. $\sec\theta\cot\theta = \csc\theta$

$\frac{1}{\cos\theta}\left(\frac{\cos\theta}{\sin\theta}\right) = \frac{1}{\sin\theta}$

$\frac{1}{\sin\theta} = \frac{1}{\sin\theta}$

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

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

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

$\cos^2\theta = \cos^2\theta$

3. $\sin(x+y) + \sin(x-y) = 2\sin x\cos y$

$\sin x\cos y + \cancel{\cos x\sin y} + \sin x\cos y - \cancel{\cos x\sin y} = 2\sin x\cos y$

$2\sin x\cos y = 2\sin x\cos y$

4. $\frac{\csc\theta}{\sec\theta} + \frac{\cos\theta}{\sin\theta} = 2\cot\theta$

$\frac{1}{\sin\theta} \cdot \frac{\cos}{1}$

$\frac{\frac{1}{\sin\theta}}{\frac{1}{\cos\theta}} + \frac{\cos\theta}{\sin\theta}$

$\frac{\cos\theta}{\sin\theta} + \frac{\cos\theta}{\sin\theta} = 2\cot\theta$

$2\left(\frac{\cos\theta}{\sin\theta}\right) = 2\left(\frac{\cos\theta}{\sin\theta}\right)$

5. $\frac{\sec^2\theta}{\tan\theta} = \sec\theta\csc\theta$

$\frac{1 + \tan^2\theta}{\tan\theta} = \frac{1}{\cos\theta} \cdot \frac{1}{\sin\theta}$

$\frac{\sin^2}{\cos^2}$

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

$\frac{1}{\cos^2\theta} \cdot \frac{\cos\theta}{\sin\theta} = \frac{1}{\cos\theta} \cdot \frac{1}{\sin\theta}$

6. $\cos^2 x(1 + \tan^2 x) = 1$

$\cos^2 x\left(1 + \frac{\sin^2 x}{\cos^2 x}\right) = 1$

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

$1 = 1$

7. $1 + \sec^2\theta\sin^2\theta = \sec^2\theta$

$1 + \left(\frac{1}{\cos^2\theta}\right)(\sin^2\theta) = \sec^2\theta$

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

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

$\sec^2\theta = \sec^2\theta$

8. $\frac{1}{1-\cos x} - \frac{1}{1+\cos x} = 2\csc x\cot x$

$1+\cos x \quad 1-\cos x$

$\frac{1+\cos x}{(1+\cos x)(1-\cos x)} + \frac{-(1-(\cos x))}{(1+\cos x)(1-\cos x)} = 2\csc x\cot x$

$\frac{2\cos x}{1-\cos^2 x} = 2\left(\frac{1}{\sin x}\right)\left(\frac{\cos}{\sin}\right)$

$\frac{2\cos x}{\sin^2 x} = \frac{2\cos x}{\sin^2 x}$

9. $\frac{\sin^2\theta + 5\sin\theta + 6}{\sin^2\theta - 4} = \frac{\sin\theta + 3}{\sin\theta - 2}$

$\frac{\cancel{(\sin\theta+2)}(\sin\theta+3)}{\cancel{(\sin\theta+2)}(\sin\theta-2)} = \frac{\sin\theta+3}{\sin\theta-2}$

$\frac{\sin\theta+3}{\sin\theta-2} = \frac{\sin\theta+3}{\sin\theta-2}$

10. $\cancel{\cos}$ $\sin x(1 - 2\cos^2 x + \cos^4 x) = \sin^5 x$

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

$\sin x(\sin^2 x)(\sin^2 x) =$

$\sin^5 x = \sin^5 x$