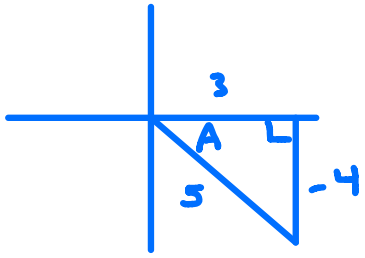
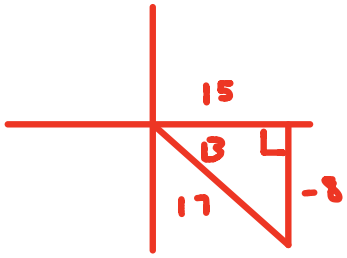
GSE Precalculus Trig Identities Review Name: Key Block: __

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. $\sin(\alpha+\beta)$ $-\frac{84}{85}$

4. $\cos(\alpha-\beta)$ $\frac{77}{85}$

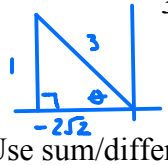
5. $\tan(\alpha-\beta)$ $\frac{-36}{77}$

6. $\sin(2\alpha)$ $-\frac{24}{25}$

7. $\cos(2\beta)$ $\frac{161}{289}$

8. $\tan(2\beta)$ $-\frac{240}{161}$

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



$\sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}} = \frac{3}{-2\sqrt{2}} = \boxed{\frac{-3\sqrt{2}}{2}}$

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

10. $\sin 60° = \sin(90° - 30°)$

$\frac{\sqrt{3}}{2}$

$\sin(90)\cdot\cos(30) - \cos(90)\sin(30)$

$(1)\left(\frac{\sqrt{3}}{2}\right) - (0)\left(\frac{1}{2}\right)$

11. $\cos 75° = \cos(120° - 45°)$

$\frac{\sqrt{6}-\sqrt{2}}{4}$

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

$\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$

12. $\sin 70^o\cos 40^o - \cos 70^o\sin 40^o$

$\sin 70 - 40 = \boxed{\sin 30}$

13. $\cos 210^o\cos 80^o + \sin 210^o\sin 80^o$

$\cos 210 - 80 = \boxed{\cos 130}$

Simplify the trig expression.

1. $\sin\theta \sec\theta$

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

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

$\tan\theta$

2. $\frac{\sec x}{\csc x}$

$\frac{1}{\cos x} \div \frac{1}{\sin x}$

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

$\frac{\sin x}{\cos x}$

$\tan x$

3. $\cos^2\theta\,(1 + \tan^2\theta)$

$\cos^2\theta\,(\sec^2\theta)$

1

4. $\frac{\cos^2 y}{1+\sin y}$

$\frac{1-\sin^2 y}{1+\sin y}$

$\frac{(1-\sin y)(1+\sin y)}{1+\sin y}$

$1-\sin y$

5. $(\tan x)(\cos x)(\csc x)$

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

1

6. $\frac{\tan x+1}{\sec x}$

$\frac{\tan x}{\sec x} + \frac{1}{\sec x}$

$\tan x \div \sec x + \cos x$

$\frac{\sin x}{\cos x} \div \frac{1}{\cos x} + \cos x$

$\frac{\sin x}{\cos x} \cdot \frac{\cos x}{1} + \cos x$

$\sin x + \cos x$

7. $1 - (\sec^2 x - \tan^2 x)$

$1 - 1$

0

8. $\frac{\cot^2 x}{\csc x - 1}$

$\frac{\csc^2 x - 1}{\csc x - 1}$

$\frac{(\csc x - 1)(\csc x + 1)}{\csc x - 1}$

$\csc x + 1$

9. $\frac{\sin x+\cos x}{\sin x \cos x}$

$\frac{\sin x}{\sin x \cos x} + \frac{\cos x}{\sin x \cos x}$

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

$\sec x + \csc x$

Verify the following.

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

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

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

$\csc\theta = \csc\theta$ ✓

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

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

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

$\cos^2\theta = \cos^2\theta$ ✓

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

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

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

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

$\sec^2\theta = \sec^2\theta$ ✓

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

$\frac{1}{\sin\theta} \div \frac{1}{\cos\theta} + \frac{\cos\theta}{\sin\theta} = 2\cot\theta$

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

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

$\cot\theta + \cot\theta = 2\cot\theta$

$2\cot\theta = 2\cot\theta$ ✓

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

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

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

$\frac{1}{\cos\theta\sin\theta} = \sec\theta\csc\theta$

$\sec\theta\csc\theta = \sec\theta\csc\theta$ ✓

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

$\cos^2 x\,(\sec^2 x) = 1$

$\frac{\cos^2 x}{1} \cdot \frac{1}{\cos^2 x} = 1$

$1 = 1$ ✓