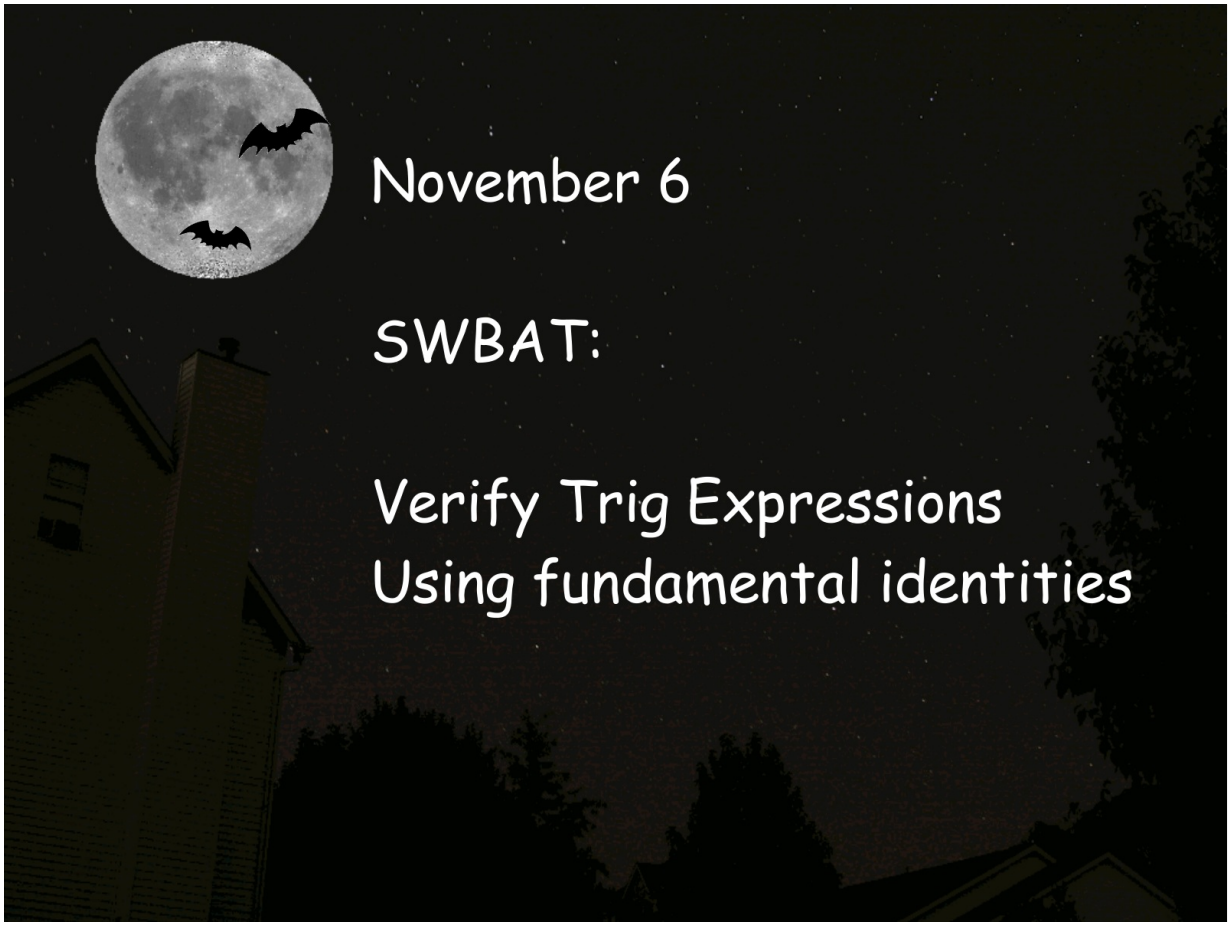


Fundamental Identities

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**Reciprocal Identities**

$\sin(\theta) = \frac{1}{\csc(\theta)}$ $\cos(\theta) = \frac{1}{\sec(\theta)}$ $\tan(\theta) = \frac{1}{\cot(\theta)}$

$\csc(\theta) = \frac{1}{\sin(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

**Quotient Identities**

$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$ $\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$

**Pythagorean Identities**

$\sin^2(\theta) + \cos^2(\theta) = 1$

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

$1 + \cot^2(\theta) = \csc^2(\theta)$

**Cofunction Identities**

$\sin(\alpha) = \cos(90 - \alpha)$ $\cos(\alpha) = \sin(90 - \alpha)$

$\csc(\alpha) = \sec(90 - \alpha)$ $\sec(\alpha) = \csc(90 - \alpha)$

$\tan(\alpha) = \cot(90 - \alpha)$ $\cot(\alpha) = \tan(90 - \alpha)$

Reciprocal Identities

Quotient Identities $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$ $\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$

Pythagorean Identities

Cofunction Identities

Show

$\cot(x)\sin(x) = \cos(x)$

$\cot(x)\sin(x) = \cos(x)$

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

quotient identity

$\frac{\cos(x)\sin(x)}{\sin(x)} = \cos(x)$

$\cos x = \cos x$

Reciprocal Identities $\sin(\theta) = \frac{1}{\csc(\theta)}$ $\cos(\theta) = \frac{1}{\sec(\theta)}$ $\tan(\theta) = \frac{1}{\cot(\theta)}$

Quotient Identities $\csc(\theta) = \frac{1}{\sin(\theta)}$ $\sec(\theta) = \frac{1}{\cos(\theta)}$ $\cot(\theta) = \frac{1}{\tan(\theta)}$

Pythagorean Identities

Cofunction Identities

Show

$\frac{\tan\beta}{\sec\beta} = \sin\beta$

$\frac{\tan\beta}{\sec\beta} = \sin\beta$

quotient identity → $\frac{\left(\frac{\sin\beta}{\cos\beta}\right)}{\left(\frac{1}{\cos\beta}\right)} = \sin\beta$

reciprocal identity →

$\frac{\sin\beta}{\cos\beta} \cdot \frac{\cos\beta}{1} = \sin\beta$

Show
$\sin x(\csc x - \sin x) = \cos^2 x$

Reciprocal Identities

Quotient Identities

Pythagorean Identities

Cofunction Identities

$\sin^2(\theta) + \cos^2(\theta) = 1$

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

$1 + \cot^2(\theta) = \csc^2(\theta)$

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

$\sin x \csc x - \sin^2 x = \cos^2 x$

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

reciprocal identity

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

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

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

pythagorean identity

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

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Find all solutions on the interval $[0, 2\pi)$

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

Reciprocal Identities

Quotient Identities

Pythagorean Identities

Cofunction Identities

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

$1 - \cos^2 x = 3\cos^2 x$

$+\cos^2 x \quad +\cos^2 x$

$\frac{1}{4} = \frac{4\cos^2 x}{4}$

$\sqrt{\frac{1}{4}} = \sqrt{\cos^2 x}$

$\pm\sqrt{\frac{1}{4}} = \cos x$

$\pm\frac{1}{2} = \cos x$

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

$\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3} = x$

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

$-\cos^2 x \quad -\cos^2 x$

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

Find all solutions on the interval $[0, 2\pi)$

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

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

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

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

$+3\sin^2 x \quad +3\sin^2 x$

$\frac{4\sin^2 x}{4} = \frac{3}{4}$

$\sqrt{\sin^2 x} = \sqrt{\frac{3}{4}}$

$\sin x = \pm\frac{\sqrt{3}}{2}$

$\sin^{-1}(\sin x) = \sin^{-1}\left(\pm\frac{\sqrt{3}}{2}\right)$

$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

Pythagorean Identity

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

$-\sin^2 x \quad -\sin^2 x$

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