

Warm-up 2/22/17

Graph.

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

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

$$\sin x$$

5.1: Fundamental Identities

Two functions f and g are said to be **identically equal** if

$$f(x) = g(x)$$

for every value of x for which both functions are defined. Such an equation is referred to as an **identity**. An equation that is not an identity is called a **conditional equation**.

Identities

$$(x + 1)^2 = x^2 + 2x + 1$$

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

Conditional Equation

$$3x - 4 = 2$$

$$\sin x = \cos x$$

Reciprocal Identities

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

Quotient Identities

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \cot \theta = \frac{\cos \theta}{\sin \theta}$$

Pythagorean Identities

$$\sin^2 \theta + \cos^2 \theta = 1 \quad \tan^2 \theta + 1 = \sec^2 \theta \quad 1 + \cot^2 \theta = \csc^2 \theta$$

~~\cos^2~~ \cos^2

Find $\sin \theta$ and $\cos \theta$ if $\tan \theta = 5$ and $\cos \theta > 0$.

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

$$5^2 + 1 = \sec^2 \theta$$

$$26 = (\sec \theta)^2$$

$$\sqrt{26} = \sec \theta$$

$$\cos \theta = \frac{1}{\sqrt{26}}$$

$$(\tan \theta)^2$$

$$5 = \frac{\sin \theta}{\frac{1}{\sqrt{26}}}$$

$$\frac{5}{\sqrt{26}} = \sin \theta$$

Cofunction Identities

$$\sin(\pi/2 - \theta) = \cos \theta$$

$$\cos(\pi/2 - \theta) = \sin \theta$$

$$\tan(\pi/2 - \theta) = \cot \theta$$

$$\cot(\pi/2 - \theta) = \tan \theta$$

$$\sec(\pi/2 - \theta) = \csc \theta$$

$$\csc(\pi/2 - \theta) = \sec \theta$$

Odd-Even Identities

$$\sin(-\theta) = -\sin \theta$$

$$\cos(-\theta) = \cos \theta$$

$$\tan(-\theta) = -\tan \theta$$

$$\csc(-\theta) = -\csc \theta$$

$$\sec(-\theta) = \sec \theta$$

$$\cot(-\theta) = -\cot \theta$$

odd

even

odd

If $\cos \theta = 0.34$, find $\sin(\theta - \pi/2)$.

$$\sin(-(\pi/2 - \theta))$$

$$-\sin(\pi/2 - \theta)$$

$$-\cos \theta = -.34$$

If $\sin \theta = 0.19$, find $\cos(\theta - \pi/2)$.

$$\cos(-(\pi/2 - \theta))$$

$$\cos(\pi/2 - \theta)$$

$$\sin \theta = .19$$

Simplify the expression.

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

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

$$(\sin x)(1)$$

$$\sin x$$

Simplify the expression.

$$\cos \theta (\tan \theta + \cot \theta)$$

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

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

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

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

Assignment: p. 410

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