

odd function

Even function .

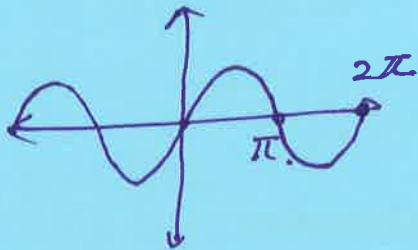
$$f(-x) = -f(x)$$

$$f(-x) = f(x)$$

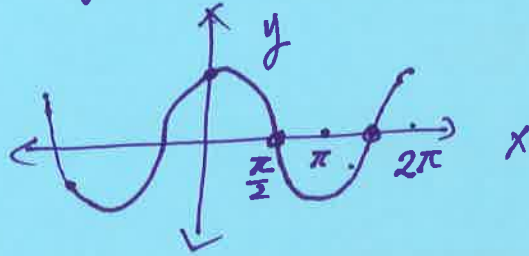
Rotational sym. about origin.

line sym. About y-axis

$$y = \sin x$$



$$y = \cos x$$



$$y = \sin x$$

$$\begin{aligned} y &= \cos\left(\frac{\pi}{2} - x\right) \\ &= \cos\left[-\left(x + \frac{\pi}{2}\right)\right] \end{aligned}$$

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

Trig Identity Verification Day two

MM1

$$1. \frac{1}{\sin x - 1} - \frac{1}{\sin x + 1} = -2 \sec^2 x$$

$$3. \frac{\sec^2 x - 1}{\sec^2 x} = \sin^2 x$$

$$5. \frac{\tan x + \sec x}{\sec x - \cos x + \tan x} = \csc x$$

$$7. \frac{\sin x}{1 + \cos x} + \frac{\cos x}{\sin x} = \csc x$$

$$2. \csc x (\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x = \csc^2 x$$

$$4. \frac{1}{\cos x} - \frac{\cos x}{1 + \sin x} = \tan x$$

$$6. \frac{\csc x}{\cot x + \tan x} = \cos x$$

$$8. \frac{1}{1 + \sin x} = \sec^2 x - \tan x \sec x$$

$$\# 1. \frac{(\sin x + 1)}{(\sin x + 1)(\sin x - 1)} - \frac{1}{(\sin x + 1)(\sin x - 1)}$$

$$(a+b)(a-b) = a^2 - b^2$$

$$= \frac{\sin x + 1}{\sin^2 x - 1} - \frac{\sin x - 1}{\sin^2 x - 1}$$

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

$$= \frac{(\cancel{\sin x + 1}) - \cancel{\sin x} + 1}{\sin^2 x - 1} = \frac{2}{-\cos^2 x}$$

$$= \boxed{-2 \sec^2 x}$$

$$\# 2. \csc x (\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x$$

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

$$= (\csc^2 x - 1) + 1 - \cot x + \cot x$$

$$= \boxed{\csc^2 x}$$

$$\#5. \frac{\tan x + \sec x}{\sec x - \cos x + \tan x}$$

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

$$\left(\frac{1}{\cos x} - \cos x + \frac{\sin x}{\cos x} \right) \cos x$$

$$= \frac{\sin x + 1}{\underbrace{1 - \cos^2 x}_{= \sin^2 x} + \sin x} = \frac{\sin x + 1}{\sin^2 x + \sin x}$$

$$= \frac{\sin x + 1}{\sin x (\sin x + 1)} = \frac{1}{\sin x} = \boxed{\csc x}$$

#4. $\frac{1}{\cos x} - \frac{\cos x}{1 + \sin x}$

$$\begin{aligned}
 &= \frac{1 + \sin x - (\cos x)(\cos x)}{(\cos x)(1 + \sin x)} \\
 &= \frac{1 + \sin x - \cos^2 x}{\cos x (1 + \sin x)} = \frac{\overset{\text{Sin}^2 x}{1 - \cos^2 x} + \sin x}{\cos x (1 + \sin x)} \\
 &= \frac{\sin^2 x + \sin x}{\cos x (1 + \sin x)} = \frac{\sin x (\sin x + 1)}{\cos x (1 + \sin x)} \\
 &= \frac{\sin x}{\cos x} = \boxed{\tan x}
 \end{aligned}$$

#7.

$$\begin{aligned}
 &\frac{\sin x}{1 + \cos x} + \frac{\cos x}{\sin x} \\
 &= \frac{(\sin x)(\sin x) + \cos x (1 + \cos x)}{(\sin x)(1 + \cos x)} \\
 &= \frac{\sin^2 x + \cos^2 x + \cos x}{\sin x (1 + \cos x)} \\
 &= \frac{\cancel{1 + \cos x}}{\sin x \cancel{(1 + \cos x)}} = \frac{1}{\sin x} = \boxed{\csc x}
 \end{aligned}$$