

Warm Up

Prove the following identities:

$$\tan \theta + \tan^3 \theta = \frac{1}{\cot \theta \cos^2 \theta}$$

$\boxed{\tan \theta} \boxed{(1 + \tan^2 \theta)}$ $\frac{\sin \theta}{\cos \theta} \cdot \sec^2 \theta$ $\frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\cos^2 \theta}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\frac{\sin \theta}{\cos^3 \theta}$ </div>		$\frac{1}{\frac{\cos \theta}{\sin \theta} \cdot \cos^2 \theta}$ $\frac{1}{\frac{\cos^3 \theta}{\sin \theta}}$ $1 \cdot \frac{\sin \theta}{\cos^3 \theta}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\frac{\sin \theta}{\cos^3 \theta}$ </div>
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$$\tan \theta + \tan^3 \theta = \frac{1}{\cot \theta \cos^2 \theta}$$

$\underline{\tan \theta} \underline{(1 + \tan^2 \theta)}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\tan \theta \sec^2 \theta$ </div>		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid red; padding: 5px; margin: 5px;"> $\left(\frac{1}{\cot \theta} \right)$ </div> <div style="border: 1px solid blue; padding: 5px; margin: 5px;"> $\left(\frac{1}{\cos^2 \theta} \right)$ </div> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\tan \theta \sec^2 \theta$ </div>
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Questions from homework

⑥ $\sin^2 \theta + 2\cos^2 \theta - 1 = \cos^2 \theta$

group like terms \rightarrow

$$\frac{2\cos^2 \theta - \cos^2 \theta}{\cos^2 \theta} \quad \left| \quad \frac{1 - \sin^2 \theta}{\cos^2 \theta}$$

⑩ $\frac{1 + 2\sin \theta \cos \theta}{\sin \theta + \cos \theta} = \frac{\sin \theta + \cos \theta}{1}$

$$\frac{1 + 2\sin \theta \cos \theta}{\sin \theta + \cos \theta} \quad \left| \quad \frac{(\sin \theta + \cos \theta)(\sin \theta + \cos \theta)}{\sin^2 \theta + 2\sin \theta \cos \theta + \cos^2 \theta}$$

$$\frac{1 + 2\sin \theta \cos \theta}{\sin \theta + \cos \theta} \quad \left| \quad \frac{1 + 2\sin \theta \cos \theta}{1}$$

⑦ $\sec^2 \theta - \sin^2 \theta = \cos^2 \theta + \tan^2 \theta$

$$\frac{\sec^2 \theta - \tan^2 \theta}{\sec^2 \theta - \tan^2 \theta} \quad \left| \quad \frac{\cos^2 \theta + \sin^2 \theta}{1}$$

⑧ $\tan^2 \theta - \sin^2 \theta = \sin^2 \theta \tan^2 \theta$

$$\frac{\frac{\sin^2 \theta}{\cos^2 \theta} - \frac{\sin^2 \theta}{1}}{\frac{\sin^2 \theta}{\cos^2 \theta} - \frac{\sin^2 \theta}{1}} \quad \left| \quad \frac{\frac{\sin^2 \theta}{1} \left(\frac{\sin^2 \theta}{\cos^2 \theta} \right)}{\frac{\sin^2 \theta}{1} \left(\frac{\sin^2 \theta}{\cos^2 \theta} \right)}$$

Factor \rightarrow

$$\frac{\sin^2 \theta - \sin^2 \theta \cos^2 \theta}{\cos^2 \theta} \quad \left| \quad \frac{\sin^4 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta (1 - \cos^2 \theta)}{\cos^2 \theta} \quad \left| \quad \frac{\sin^4 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta (\sin^2 \theta)}{\cos^2 \theta} \quad \left| \quad \frac{\sin^4 \theta}{\cos^2 \theta}$$

$$\frac{\sin^4 \theta}{\cos^2 \theta} \quad \left| \quad \frac{\sin^4 \theta}{\cos^2 \theta}$$

$$\frac{1}{\sec^2 \theta \cot \theta} = \frac{\sin \theta - \sin^3 \theta}{\cos \theta}$$

$$\frac{1}{\sec^2 \theta} \cdot \frac{1}{\cot \theta}$$

$$\cos^2 \theta \cdot \tan \theta$$

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

$$\sin \theta \cos \theta$$

$$\frac{\sin \theta (1 - \sin^2 \theta)}{\cos \theta}$$

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

$$\sin \theta \cos \theta$$

Homework

$$\textcircled{3} \quad \cos\theta + \boxed{\tan\theta} \sin\theta = \boxed{\sec\theta}$$

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

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

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

$$\boxed{\frac{1}{\cos\theta}}$$

$$\boxed{\frac{1}{\cos\theta}}$$