30 $\dfrac{\cot\theta - \tan\theta}{\sin\theta\cos\theta} = \csc^2\theta - \sec^2\theta$ GIVEN

$\dfrac{\cot\theta}{\sin\theta\cos\theta} - \dfrac{\tan\theta}{\sin\theta\cos\theta} = \csc^2\theta - \sec^2\theta$ SUBTRACTION

$\dfrac{\frac{\cos\theta}{\sin\theta}}{\frac{\sin\theta\cos\theta}{1}} - \dfrac{\frac{\sin\theta}{\cos\theta}}{\frac{\sin\theta\cos\theta}{1}} = \csc^2\theta - \sec^2\theta$ QUOTIENT IDENTITY

$\dfrac{\cos\theta}{\sin\theta} \cdot \dfrac{1}{\sin\theta\cos\theta} - \dfrac{\sin\theta}{\cos\theta} \cdot \dfrac{1}{\sin\theta\cos\theta} = \csc^2\theta - \sec^2\theta$ DIVISION

$\dfrac{1}{\sin\theta} \cdot \dfrac{1}{\sin\theta} - \dfrac{1}{\cos\theta} \cdot \dfrac{1}{\cos\theta} = \csc^2\theta - \sec^2\theta$ DIVISION

$\dfrac{1}{\sin^2\theta} - \dfrac{1}{\cos^2\theta} = \csc^2\theta - \sec^2\theta$ MULTIPLICATION

$\csc^2\theta - \sec^2\theta = \csc^2\theta - \sec^2\theta$ ■ RECIPROCAL IDENTITY

(31) $\frac{\sin\theta}{\csc\theta} + \frac{\cos\theta}{\sec\theta} = \sin\theta\csc\theta$ GIVEN

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

$\sin\theta \cdot \sin\theta + \cos\theta \cdot \cos\theta = \sin\theta\csc\theta$ RECIPROCAL IDENTITY

$\sin^2\theta + \cos^2\theta = \sin\theta\csc\theta$ MULTIPLICATION

$\sin^2\theta + 1 - \sin^2\theta = \sin\theta\csc\theta$ PYTHAGOREAN IDENTITY

$\sin\theta\left(\sin\theta + \frac{1}{\sin\theta} - \sin\theta\right) = \sin\theta\csc\theta$ FACTOR

$\sin\theta\left(\frac{1}{\sin\theta}\right) = \sin\theta\csc\theta$ SUBTRACTION

$\sin\theta\csc\theta = \sin\theta\csc\theta$ ■ RECIPROCAL IDENTITY

(32) $\frac{1-\sin^2\theta}{1+\cot^2\theta} = \sin^2\theta\cos^2\theta$ GIVEN

$\frac{\cos^2\theta}{1+\cot^2\theta} = \sin^2\theta\cos^2\theta$ PYTHAGOREAN IDENTITY

$\frac{\cos^2\theta}{\csc^2\theta} = \sin^2\theta\cos^2\theta$ PYTHAGOREAN IDENTITY

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

$\sin^2\theta\cos^2\theta = \sin^2\theta\cos^2\theta$ ■ RECIPROCAL IDENTITY

(33) $\tan^2 x - \sin^2 x = \tan^2 x \sin^2 x$ GIVEN

$\frac{\sin^2 x}{\cos^2 x} - \frac{\sin^2 x}{1} = \tan^2 x \sin^2 x$ QUOTIENT IDENTITY

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

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

$\frac{\sin^2 x (1 - \cos^2 x)}{\cos^2 x} = \tan^2 x \sin^2 x$ FACTOR

$\frac{\sin^2 x (\sin^2 x)}{\cos^2 x} = \tan^2 x \sin^2 x$ PYTHAGOREAN IDENTITY

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

$\tan^2 x \cdot \sin^2 x = \tan^2 x \sin^2 x$ ■ QUOTIENT IDENTITY

(34) $\frac{\tan^2 x}{1 + \tan^2 x} = \sin^2 x$ GIVEN

$\frac{\tan^2 x}{\sec^2 x} = \sin^2 x$ PYTHAGOREAN IDENTITY

$\tan^2 x \cdot \frac{1}{\sec^2 x} = \sin^2 x$ DIVISION

$\tan^2 x \cdot \cos^2 x = \sin^2 x$ RECIPROCAL IDENTITY

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

$\sin^2 x = \sin^2 x$ ■ DIVISION