

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Verify Trigonometric Identities Bell Work

Verify each identity.

1.  $\cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$

2.  $\frac{1}{1-\tan^2\theta} + \frac{1}{1-\cot^2\theta} = 1$

**Verify Trigonometric Identities** Bell Work**Answers**

Verify each identity.

1.  $\cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$

Take L.H.S:

$$\cos^4\theta - \sin^4\theta = (\cos^2\theta - \sin^2\theta)(\cos^2\theta + \sin^2\theta)$$

$$= (\cos^2\theta - \sin^2\theta)(1) \quad (\text{Pythagorean Identity})$$

$$= \cos^2\theta - \sin^2\theta$$

= R.H.S

$$\rightarrow \cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$$

2.  $\frac{1}{1-\tan^2\theta} + \frac{1}{1-\cot^2\theta} = 1$

Take L.H.S:

$$\frac{1}{1-\tan^2\theta} + \frac{1}{1-\cot^2\theta} = \frac{1-\cot^2\theta+1-\tan^2\theta}{(1-\tan^2\theta)(1-\cot^2\theta)}$$

$$= \frac{1 - \frac{\cos^2\theta}{\sin^2\theta} + 1 - \frac{\sin^2\theta}{\cos^2\theta}}{\left(1 - \frac{\sin^2\theta}{\cos^2\theta}\right)\left(1 - \frac{\cos^2\theta}{\sin^2\theta}\right)} \quad (\text{Reciprocal Identity})$$

$$= \frac{\frac{\sin^2\theta - \cos^2\theta}{\sin^2\theta} + \frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta}}{\left(\frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta}\right)\left(\frac{\sin^2\theta - \cos^2\theta}{\sin^2\theta}\right)}$$

$$= \frac{\frac{\cos^2\theta(\sin^2\theta - \cos^2\theta) + \sin^2\theta(\cos^2\theta - \sin^2\theta)}{\cos^2\theta\sin^2\theta}}{\left(\frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta}\right)\left(\frac{\sin^2\theta - \cos^2\theta}{\sin^2\theta}\right)}$$

$$= \frac{(\cos^2\theta + \sin^2\theta)(\cos^2\theta - \sin^2\theta)}{(\cos^2\theta - \sin^2\theta)} = (\cos^2\theta + \sin^2\theta) = 1 = \text{R.H.S} \quad (\text{Pythagorean Identity})$$

$$\rightarrow \frac{1}{1-\tan^2\theta} + \frac{1}{1-\cot^2\theta} = 1$$