

Trigonometric Identity Worksheet

Part A

Prove the following identities. Each question has different tricks – you must complete all of them!

2) $\cos\theta \times \tan\theta = \sin\theta$	3) $\frac{\cot\theta}{\tan\theta} = \frac{1 - \sin^2\theta}{1 - \cos^2\theta}$	4) $\cot^2\theta = \frac{\cos^2\theta}{1 - \cos^2\theta}$
5) $\frac{\csc\theta}{\sec\theta} = \cot\theta$	6) $(\sin\theta + \cos\theta)^2 = 1 + 2\sin\theta\cos\theta$	7) $2\sin^2\theta - 1 = \sin^2\theta - \cos^2\theta$
8) $\frac{1}{\sin^2\theta} + \frac{1}{\cos^2\theta} = \frac{1}{\sin^2\theta \cos^2\theta}$	9) $\cos^2\theta = \sin^2\theta + 2\cos^2\theta - 1$	10) $\tan\theta = \tan^2\theta \times \cot\theta$
11) $\sec^2\theta + \csc^2\theta = \sec^2\theta \times \csc^2\theta$	12) $\frac{1}{1 + \sin\theta} + \frac{1}{1 - \sin\theta} = 2\sec^2\theta$	13) $\tan^2\theta - \sin^2\theta = \sin^2\theta \tan^2\theta$
14) $\cot^2\theta + \sec^2\theta = \tan^2\theta + \csc^2\theta$	15) $\frac{1 + 2\sin\theta\cos\theta}{\sin\theta + \cos\theta} = \sin\theta + \cos\theta$	16) $\frac{\sec\theta + 1}{\sec\theta - 1} + \frac{\cos\theta + 1}{\cos\theta - 1} = 0$
17) $\frac{\tan\theta \sin\theta}{\tan\theta + \sin\theta} = \frac{\tan\theta - \sin\theta}{\tan\theta \sin\theta}$	18) $\frac{\csc\theta + \cot\theta}{\csc\theta - \cot\theta} = \frac{1 + 2\cos\theta + \cos^2\theta}{\sin^2\theta}$	19) $\sin\theta \times \cos\theta \times \tan\theta = 1 - \cos^2\theta$
20) $\sin\theta + \tan\theta = \tan\theta(1 + \cos\theta)$	21) $\tan\theta + \cot\theta = \sec\theta \csc\theta$	22) $\frac{\csc\theta}{\csc\theta - 1} + \frac{\csc\theta}{\csc\theta + 1} = 2\sec^2\theta$
23) $(1 - \cos^2\theta)(1 + \cot^2\theta) = 1$	24) $\sec^4\theta - \tan^4\theta = 1 + 2\tan^2\theta$	25) $\frac{\cos\theta}{\sec\theta} - \frac{\sin\theta}{\cot\theta} = \frac{\cos\theta \cot\theta - \tan\theta}{\csc\theta}$
26) $\sin^4\theta - \cos^4\theta = 1 - 2\cos^2\theta$	27) $\sec^2\theta - \sin^2\theta = \cos^2\theta + \tan^2\theta$	

2)

$$LS = \cos\theta \times \tan\theta$$

$$= \cancel{\cos\theta} \times \frac{\sin\theta}{\cancel{\cos\theta}}$$

$$= \sin\theta$$

$$\therefore \cos\theta \times \tan\theta = \sin\theta$$

$$\therefore LS = RS$$

3) LS

$$LS = \frac{\cot\theta}{\tan\theta}$$

$$= \frac{\frac{\cos\theta}{\sin\theta}}{\frac{\sin\theta}{\cos\theta}}$$

$$= \frac{\cos\theta}{\sin\theta} \times \frac{\cos\theta}{\sin\theta}$$

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

RS

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

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

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

$$\therefore LS = RS$$