7.6) Proving trigonometric identities

Worked example

Prove that:

$$\cot 2\theta \equiv \frac{\cot\theta - \tan\theta}{2}$$

Your turn

Prove that:

$$\tan 2\theta \equiv \frac{2}{\cot\theta - \tan\theta}$$

Proof

Worked example

Prove that:

$$\frac{-\sin 2\theta}{\cos 2\theta - 1} \equiv \cot \theta$$

Your turn

Prove that:

$$\frac{1 - \cos 2\theta}{\sin 2\theta} \equiv \tan \theta$$

Proof

Worked example

Prove that:

$$\cot 2x - cosec\ 2x \equiv -\tan x$$

Your turn

Prove that:

$$\cot 2x + cosec\ 2x \equiv \cot x$$

Proof

Worked example

Prove, starting with the left-hand side:

$$\tan 2x + sec\ 2x \equiv \frac{\cos x + \sin x}{\cos x - \sin x}$$

Your turn

Prove, starting with the right-hand side:

$$\tan 2x + sec\ 2x \equiv \frac{\cos x + \sin x}{\cos x - \sin x}$$

Proof

Worked example

Show that:

$$\sin^4\theta = \frac{3}{8} - \frac{1}{2}\cos 2\theta + \frac{1}{8}\cos 4\theta$$

Your turn

Show that:

$$\cos^4\theta = \frac{3}{8} + \frac{1}{2}\cos 2\theta + \frac{1}{8}\cos 4\theta$$

Shown

Worked example

By writing $\cos x = \cos\left(2 \times \frac{x}{2}\right)$, prove the identity

$$\frac{1 + \cos x}{1 - \cos x} \equiv \cot^2\left(\frac{x}{2}\right)$$

Your turn

By writing $\cos x = \cos\left(2 \times \frac{x}{2}\right)$, prove the identity

$$\frac{1 - \cos x}{1 + \cos x} \equiv \tan^2\left(\frac{x}{2}\right)$$

Proof