

### 7.4 Verifying equations are Identities

LT44: I can use the double angle and half-angle identities to find exact values and prove other identities.

#### Review

If  $\sin \theta = \frac{2}{5}$  and  $0 < \theta < \frac{\pi}{2}$ , find  $\cos 2\theta$

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

$$= 1 - 2\left(\frac{2}{5}\right)^2$$

$$= 1 - 2\left(\frac{4}{25}\right)$$

$$= 1 - \frac{8}{25}$$

$$\left(\frac{17}{25}\right)$$

#### Example

$$1 - \cos 2x \sec^2 x = \tan^2 x$$

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

$$1 - \left(\frac{\cos^2 x}{\cos^2 x} - \frac{\sin^2 x}{\cos^2 x}\right) =$$

$$1 - (1 - \tan^2 x) =$$

$$\tan^2 x = \tan^2 x \quad \checkmark$$