3.6 Trigonometric identities

Checklist

What you should know

By the end of this subtopic you should be able to:

- use the trigonometric identity: $\tan\theta = \frac{\sin\theta}{\cos\theta}$
- use the Pythagorean identity: $\cos^2\theta + \sin^2\theta = 1$
  - to find the value of $\sin\theta$ and $\tan\theta$ if $\cos\theta$ is given
  - to find the value of $\cos\theta$ and $\tan\theta$ if $\sin\theta$ is given
  - to find the value of $\sin\theta$ and $\cos\theta$ if $\tan\theta$ is given
  - to prove other trigonometric identities
- use the double-angle identities: $\sin 2\theta = 2\sin\theta\cos\theta$,

$$\cos 2\theta = \begin{cases} \cos^2\theta - \sin^2\theta, \\ 2\cos^2\theta - 1, \\ 1 - 2\sin^2\theta \end{cases}$$

- to find the value of $\sin 2\theta, \sin 4\theta, \cos 2\theta, \cos 4\theta$ or $\tan 2\theta, \tan 4\theta$, ... if $\sin\theta, \cos\theta$ or $\tan\theta$ is given
- to prove identities involving double angles
- to find the exact values of trigonometric ratios involving half of special angles (for example, $\sin 15^\circ$ or $\cos 75^\circ$).