Double Angle Formulae

$$sin2\theta \equiv 2sin\theta cos\theta$$

$$cos2\theta \equiv cos^2\theta - sin^2\theta$$

We can use the Pythagorean Identity to write $cos2\theta$ in terms of only $cos^2\theta$

$$cos2\theta \equiv cos^2\theta - sin^2\theta$$

$$cos2\theta \equiv cos^2\theta - (1 - cos^2\theta)$$

$$cos2\theta \equiv 2cos^2\theta - 1$$

We can use the Pythagorean Identity to write $cos2\theta$ in terms of only $sin^2\theta$

$$cos2\theta \equiv cos^2\theta - sin^2\theta$$

$$cos2\theta \equiv 1 - sin^2\theta - sin^2\theta$$

$$cos2\theta \equiv 1 - 2sin^2\theta$$