§7.5 More trig equations

Example $1+\sin\theta = 2\cos^2\theta$ use: $\sin^2\theta+\cos^2\theta=1$.

$$1+\sin\theta = 2(1-\sin^2\theta)$$

$$2\sin^2\theta+\sin\theta-1=0$$

$$(2\sin\theta-1)(\sin\theta+1)=0$$

$\sin\theta=\frac{1}{2}$ $\sin\theta=-1$.

Example $\sin 2\theta-\cos\theta=0$ use: $\sin 2\theta = 2\sin\theta\cos\theta$

$$2\sin\theta\cos\theta-\cos\theta=0$$

$$\cos\theta(2\sin\theta-1)=0$$

$\cos\theta=0$ $\sin\theta=\frac{1}{2}$.

Example $\cos\theta+1=\sin\theta$ try: square

$$(\cos\theta+1)^2=\sin^2\theta$$

$\cos^2\theta+2\cos\theta+1=\sin^2\theta$ use $\sin^2\theta+\cos^2\theta=1$

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

$$2\cos^2\theta+2\cos\theta=0$$

$$2\cos\theta(\cos\theta+1)=0$$

$\cos\theta=0$ $\cos\theta=-1$

check solns actually work!

(note: $x=1$
$x^2=1 \Rightarrow x=\pm 1$
(but only one works))

Example $\sqrt{3}\tan\frac{\theta}{2}-1=0$

$\tan\frac{\theta}{2}=\frac{1}{\sqrt{3}}$. etc.