# Marked example 2

Paper 1 style · No calculator

## 2 7 marks AHL 3.10 · 3.11 ●●● Demanding

Consider the expression $\sin\left(x+\frac{\pi}{3}\right)+\sin\left(x-\frac{\pi}{3}\right)$, for $x \in \mathbb{R}$.

**(a)** Show that $\sin\left(x+\frac{\pi}{3}\right)+\sin\left(x-\frac{\pi}{3}\right)=\sin x$. **[3]**

**(b)** Hence solve the equation $\sin\left(x+\frac{\pi}{3}\right)+\sin\left(x-\frac{\pi}{3}\right)=\cos 2x$, for $0 \le x \le 2\pi$. **[4]**

**MARKSCHEME (a)**

$\sin x\cos\frac{\pi}{3}+\cos x\sin\frac{\pi}{3}+\sin x\cos\frac{\pi}{3}-\cos x\sin\frac{\pi}{3}$ **M1**

$=2\sin x\cos\frac{\pi}{3}$ **A1**

$=2\times\frac{1}{2}\sin x=\sin x$ **A1**

Total 3 marks

**Note** Both expansions.

**Note** AG.

**MARKSCHEME (b)**

$\sin x=1-2\sin^2 x$ **M1**

$(2\sin x-1)(\sin x+1)=0$ **A1**

$x=\frac{\pi}{6},\ x=\frac{5\pi}{6}$ **A1**

$x=\frac{3\pi}{2}$ **A1**

Total 4 marks

**Note** Using $\cos 2x=1-2\sin^2 x$.

**Note** Or $\sin x=\frac{1}{2}$, $\sin x=-1$.



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