Let $h(x) = \sin x + \sqrt{3}\cos x$. For which values of x does $h'(x) = 0$?

Let $h(x) = \sin x + \sqrt{3}\cos x$. For which values of x does $h'(x) = 0$?

26|8|25

$$h'(x) = \cos x - \sqrt{3}\sin x$$

$$h'(x) = 0 \Rightarrow \cos x - \sqrt{3}\sin x = 0$$

$$2\left(\frac{1}{2}\cos x - \frac{\sqrt{3}}{2}\sin x\right) = 0$$

$$2\sin\left(\frac{\pi}{6} - x\right) = 0$$

$$\sin\left(\frac{\pi}{6} - x\right) = 0$$

$$\frac{\pi}{6} - x = 0, \pi$$

$$\Rightarrow x = \frac{\pi}{6}, -\frac{5\pi}{6}$$

$$= \frac{\pi}{6}, \frac{7\pi}{6} \quad \text{for } 0 \le x \le 2\pi$$

Check: $h'(x) = \cos\frac{\pi}{6} - \sqrt{3}\sin\frac{\pi}{6}$

$$= \frac{\sqrt{3}}{2} - \sqrt{3}\left(\frac{1}{2}\right)$$

$$= 0$$

$h'(x) = \cos\frac{7\pi}{6} - \sqrt{3}\sin\frac{7\pi}{6}$

$$= -\frac{\sqrt{3}}{2} - \sqrt{3}\left(-\frac{1}{2}\right)$$

$$= 0$$