

STEP II, 2008, Q6

- 6 A curve has the equation $y = f(x)$, where

$$f(x) = \cos\left(2x + \frac{\pi}{3}\right) + \sin\left(\frac{3x}{2} - \frac{\pi}{4}\right).$$

- (i) Find the period of $f(x)$.
- (ii) Determine all values of x in the interval $-\pi \leq x \leq \pi$ for which $f(x) = 0$. Find a value of x in this interval at which the curve touches the x -axis without crossing it.
- (iii) Find the value or values of x in the interval $0 \leq x \leq 2\pi$ for which $f(x) = 2$.



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