

MAT Problems B - Trigonometry (1 page; 14/9/17)

[Note: These are all included in the STEP Problems]

(1) Solve $\sin\theta = \cos 4\theta$ for $0 < \theta < \pi$

(2) How many solutions does the equation

$$\sin(2\cos(2x) + 2) = 0 \text{ have, for } 0 \leq x \leq 2\pi?$$

(3) Assuming that $\sin^2\theta + \cos^2\theta = 1$, but without using any compound angle results, show that $\sin\theta\cos\theta \leq \frac{1}{2}$

(4) What is the period of $2 \sin\left(3x + \frac{\pi}{4}\right) + 3\cos\left(\frac{2x}{3} - \frac{\pi}{3}\right)$?