Question
Prove that

$$16\cos^4\theta\sin\theta = \sin 5\theta + 3\sin 3\theta + 2\sin\theta$$

Answer
Use $\sin 5\theta + 3\sin 3\theta + 2\sin\theta = Im\{(c+is)^5 + 3(c+is)^3 + 2(c+is)\}$
Expand and take imaginary parts, using the fact that $c^2 + s^2 = 1$