Answer on Question #82447 – Math – Trigonometry

Question

I need to establish the identity

$$(sin^3\theta + cos^3\theta)/(sin\theta + cos\theta) = 1 - sin\theta \cdot cos\theta$$

Solution

As $(x^3 + y^3) = (x + y) \cdot (x^2 - x \cdot y + y^2)$, hence

$$(sin^3\theta + cos^3\theta) = (sin\theta + cos\theta) \cdot (sin^2\theta - sin\theta \cdot cos\theta + cos^2\theta) = (sin\theta + cos\theta)(1 - sin\theta \cdot cos\theta)$$

Dividing both sides by $(sin\theta + cos\theta)$ we obtain the desired identity.