The Diophantine equation \( x^2 + y^4 = z^2 \) has no solutions in integers, perhaps.

We have \( x = k(mn) \), \( y^2 = k(n^2 - m^2) \), \( z = k(m^2 + n^2) \).

(1) Look at \( y^2 = k(n^2 - m^2) \) in integers. Otherwise, \( x = k(m^2 - n^2) \), \( y^2 = k(2mn) \), \( z = k(m^2 + n^2) \).

(2) Look at \( y^2 = k(2mn) \) in integers.

(1) Again: use \( k = 1 \) at first. \( y^2 = (m^2 - n^2) \).

So \( m^2 = y^2 + n^2 \). Thus \( m = (p^2 + q^2) \), \( y = 2pq \) or \( (p^2 - q^2) \) and \( n = (p^2 - q^2) \).

Here in (1) again, with \( k = 1 \), we have 3 equally spaced squares, namely \( y^2, m^2 = (y^2 + n^2) \) and \( z = (m^2 + n^2) = (y^2 + n^2) + n^2 = (y^2 + 2n^2) \). I think Diophantus proved that 3 squares cannot be equally spaced. Verify?