



STEP III, 2002 Q4

4 Show that if x and y are positive and $x^3 + x^2 = y^3 - y^2$ then $x < y$.

Show further that if $0 < x \leq y - 1$, then $x^3 + x^2 < y^3 - y^2$.

Prove that there does not exist a pair of *positive* integers such that the difference of their cubes is equal to the sum of their squares.

Find all the pairs of integers such that the difference of their cubes is equal to the sum of their squares.



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