Is it true ?
Nobody Knows !

Suppose we number the prime numbers like this;

p_1	p_2	p_3	p_4	p_5	p_6	p_7	p_8	p_9	p_{10}	p_{11}
2	3	5	7	11	13	17	19	23	27	29

and I then take two consecutive primes, say the 5th and the 6th, then

$$\sqrt{13} - \sqrt{11} = 0.289$$

Professor Dr Dorin Andrica of Babes-Bolyai University in Romania has conjectured that no matter which two consecutive primes you pick, the difference between the square roots of those primes will always be less than one.

In other words, he believes that,

$$\sqrt{p_{n+1}} - \sqrt{p_n} < 1$$

It's not know if this is true or not, because nobody has found two consecutive primes that show it's false, but nor has anybody yet found a way to prove it's always true.

$$\sqrt{3} - \sqrt{2} = 0.318 < 1$$
$$\sqrt{5} - \sqrt{3} = 0.504 < 1$$
$$\sqrt{7} - \sqrt{5} = 0.409 < 1$$
$$\sqrt{11} - \sqrt{7} = 0.671 < 1$$
$$\sqrt{13} - \sqrt{11} = 0.289 < 1$$
$$\sqrt{17} - \sqrt{13} = 0.518 < 1$$

This conjecture has remained unsolved since it was first proposed in 1985.

MHH, March 2019