

QUESTION

Is 157 prime? What about 221?

ANSWER

To test whether  $n$  is prime, we need only check whether  $n$  is divisible by any prime  $\leq \sqrt{n}$ .

Now  $12^2 < 157 < 13^2$  and  $14^2 < 221 < 15^2$ , so we must test 157 for divisibility by the primes 2,3,5,7,11 and 221 for divisibility by the primes 2,3,5,7,11,13.

Quick checking methods eliminate 2,3,5 and 11 in both cases, and a check by hand establishes that 7 divides neither number.

This shows that 157 is prime, but on checking 221 for divisibility by 13, the factorisation  $221=13 \cdot 17$  is found. Thus 221 is not prime.