November 18th

x and y are positive integers.

Find all the number pairs such that

$$x^2 - y^2 = 437$$

Since $x^2 - y^2 = (x + y)(x - y)$

We look for factor pairs of 437.

By inspection, 437 is semi-prime, that is, it only has 2 prime factors

437 = 19 x 23

x + y = 23

x – y = 19

Adding gives 2x = 42

Hence **x = 21 and y = 2**

(and by extension**, x = -21 and y = -2**)

437 = 437 x 1

x + y = 437

x – y = 1

Adding gives 2x = 438

Hence **x = 219 and y = 218**

(and by extension**, x = -219 and y = -218**)