

n is a congruent number if and only if there exists a rational square q smaller than n such that:

$$\text{core}(n-q) = \text{core}(n+q)$$

An example is:

$$n = 34, q = 16.$$

$$34 - 16 = 18 = 2 * 9$$

$$34 + 16 = 50 = 2 * 25$$

Another example is:

$$n = 7, q = \left(\begin{array}{c} 7 \\ - \\ 5 \end{array} \right)^2$$

$$n - q = 14 * \left(\begin{array}{c} 3 \\ - \\ 5 \end{array} \right)^2 ; \quad n + q = 14 * \left(\begin{array}{c} 4 \\ - \\ 5 \end{array} \right)^2$$

Extending the core() function to Q over the numerator and denominator.