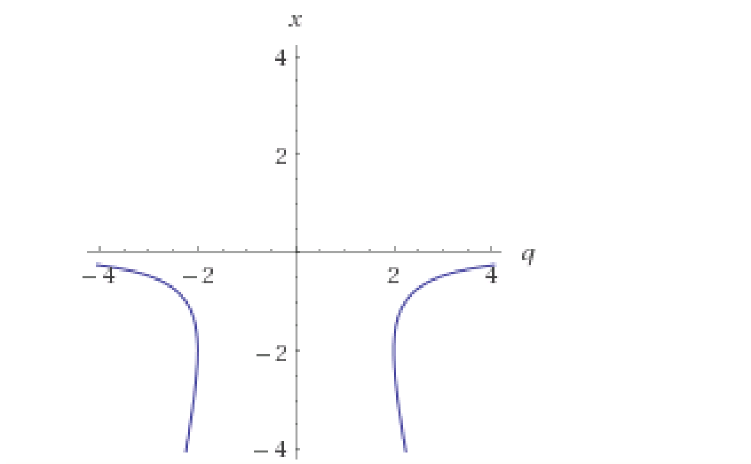
Q_i = {q*i|$x^2 + q^2x + 4 = 0$ | q is an element of N, x is an element of R}.
Then:

for $x^2 + q^2x + 4 = 0$:

Implicit plot:



The solution is:
$D = q^4 - 16$
$|q| < 2$ => no solutions ;
$|q| = 2$ => $x = -2$;
$|q|>2$ => $x = 0.5(-q^2+(q^4-16)^{0.5})$; $x = 0.5(-q^2-(q^4-16)^{0.5})$.

Then we can see, that q = {2, 3, 4, 5, …} (as q є ***N)****, and, respectively, x takes real values. =>*
q = ***N***\{1}

Q_1 = {2, 3, 4, 5, 6, 7, 8, 9, …}
Q_2 = {4, 6, 8, 10, 12, 14, 16, 18, …}
…
Q_k = {2k, 3k, 4k, 5k, 6k, 7k, 8k, …}

From this we can assume:
$\bigcup_{i=1}^{\infty} Q_i = Q_1 =$ {q|$x^2 + q^2x + 4 = 0$ | q is an element of N, x is an element of R}.
$\bigcap_{i=1}^{\infty} Q_i = \varnothing$.
