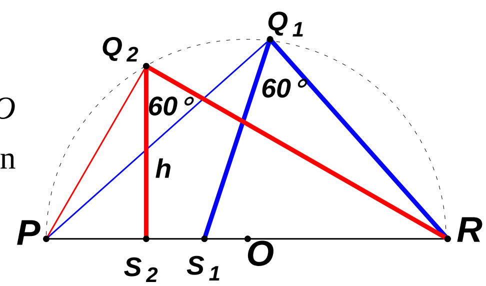
Addendum #2: Team A Question
The actual question used did not add the restriction the sum $L + M + N$ is a minimum. Strangely, no appeal was made and there should have been!

Here is the case made by Norm Swanson – Hamilton Wenham



Since no lengths are given, we can choose any convenient lengths. Furthermore, there are many possible locations for point Q for which $m\angle PQR$ is a right angle, since any point on a semi-circle with center O and diameter $\overline{PR}$ will suffice. By choosing a specific point Q_2, we can let $\overline{PS}$ (with length h) be an altitude to $\overline{PR}$, dividing $\angle PQR$ into 30° and 60° angles.
Convenient lengths:
$PQ_2 = 2 \Rightarrow Q_2R = 2\sqrt{3}, PR = 4, \underline{a = PS_2 = 1,\ b = S_2R = 3,\ h = Q_2S_2 = \sqrt{3}}$

The given formula $h^2 = \dfrac{La^2b^2}{Ma^2 + Nb^2}$ becomes $3 = \dfrac{9L}{M + 9N}$ or $1 = \dfrac{3L}{M + 9N}$ or $L = \dfrac{M}{3} + 3N$.
Since all three constants are positive integers, M must be a multiple of 3 and we get the minimum sum if we let $M = 3$, resulting in $L = 1 + 3N$.
Thus, the minimum sum occurs when $N = 1$ and (L, M, N) = **<u>(4, 3, 1)</u>**.
However, (L, M, N) is <u>not</u> unique.
In fact, any triples of the form $\left(k + 3j, 3k, j\right)$, where j and k are positive integers, are solutions.