Prompt for Multimodal Automated Theorem Proving

Example 2:
Image: (image2)
Natural language theorem statement: Let a, b, and c be the side lengths of a triangle with inradius r. If $p = \frac{a+b+c}{2}$, show that

$$\frac{1}{(p-a)^2} + \frac{1}{(p-b)^2} + \frac{1}{(p-c)^2} \geq \frac{1}{r^2}.$$

Output (Formal theorem using Lean4 language):

```
import Mathlib

theorem putnam_a2
(r : ℝ)
(A B C : EuclideanSpace ℝ (Fin 2))
(hABC : Collinear ℝ {A, B, C})
(a b c p : ℝ)
(ha : a = dist B C)
(hb : b = dist C A)
(hc : c = dist A B)
(hp : p = (dist B C + dist C A + dist A B)/2)
(hr : ∃ I : EuclideanSpace ℝ (Fin 2),
(∃! P : EuclideanSpace ℝ (Fin 2), dist I P = r ∧ Collinear ℝ {P,
    ↪ B, C}) ∧
(∃! Q : EuclideanSpace ℝ (Fin 2), dist I Q = r ∧ Collinear ℝ {Q,
    ↪ C, A}) ∧
(∃! R : EuclideanSpace ℝ (Fin 2), dist I R = r ∧ Collinear ℝ {R,
    ↪ A, B}) ∧
(∀ Z : EuclideanSpace ℝ (Fin 2), dist I Z ≤ r → Z ∈ convexHull
    ↪ ℝ {A, B, C}))
: 1/(p - a)^2 + 1/(p - b)^2 + 1/(p - c)^2 ≥ 1/r^2 :=
sorry
```

Strict Instructions:

- Only output the formal theorem in Lean 4, including all necessary imports, variable declarations, hypotheses, and the theorem statement.
- Do NOT include any proof or attempt to prove the theorem.
- Explicitly indicate that this is an unproven theorem by ending the statement with := sorry.
- Do not use by, exact, or any other proof-related keywords.