Theorem 1. Let $(x, y) \in \mathbb{R}^2$. If $x < -4$ and $y > 2$, then the distance between the points (x, y) and $(1, -2)$ is strictly larger than 6.

Instructions. Prove Thm. 1 algebraically ⟨using (in)equalities⟩. Do **not** use calculus. Do not argue geometrically but rather use geometric idea to form your Thinking Land.

Recall. The distance between $(x_1, y_1) \in \mathbb{R}^2$ and $(x_2, y_2) \in \mathbb{R}^2$, denoted by $d((x_1, y_1), (x_2, y_2))$, is

$$d((x_1, y_1), (x_2, y_2)) = \sqrt{|x_1 - x_2|^2 + |y_1 - y_2|^2}\,.$$

Symbolically: $(\forall (x, y) \in \mathbb{R}^2)\ [\ (y < -4 \wedge y > 2) \implies d((x, y), (1, -2)) > 6\ ]$

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Thinking Land. 1st a rough sketch.