

Explorations and Activities Exercise

Def. A triple (a, b, c) is a Pythagorean triple provided $(a, b, c) \in \mathbb{N}^3$ with $a < b < c$ and $a^2 + b^2 = c^2$.

▷. Pythagorean Triples were discussed in ER 1.2.13 and ER 1.2.14, which asked us to come up with and then give informal justifications (not proofs) of the following Theorems. §1.2
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Theorem 1.2.13B. There is **exactly one** Pythagorean triple of the form $(n, n + 7, n + 8)$, namely, the Pythagorean triple $(5, 12, 13)$.

Theorem 1.2.13C. There **does not exist** a Pythagorean triple of the form $(n, n + 11, n + 12)$.

Def. Three natural numbers are called consecutive natural numbers if they can be written in the form $n, n + 1$, and $n + 2$ for some $n \in \mathbb{N}$. §3.1
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►. Our Goal in this ER.

- Find all Pythagorean triples consisting of consecutive natural numbers $(n, n + 1, n + 2)$.
This is done in our Thinking Land so do not to hand in.
- State a theorem about our findings and then prove it.

1. State a theorem about precisely how many Pythagorean triples of the form $(n, n + 1, n + 2)$ exist. In the case of existence occurs, your theorem should also include precisely what the triples are (or triple is).

2. Following the Writing Guidelines, prove your theorem stated in the previous part.

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