Joe uses metal rods to make triangular frameworks in which each side has a different length.

He buys metal rods which have lengths 1 meter, 2 meters, 3 meters etc and he always keeps one rod of each length in stock.

This diagram shows one of Joe’s triangular frameworks.

$a, b, c$ are all integers and $c > b > a$.

That is, $c$ is the longest side, $a$ is the shortest side and $a, b, c$ are whole numbers.

1. How many different triangular frameworks can Joe make which have a longest side 7 meters long, using the rods he has in stock? Show your work.
2. Investigate this situation for other values of $c$.

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3. Write down any generalizations you can make.

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