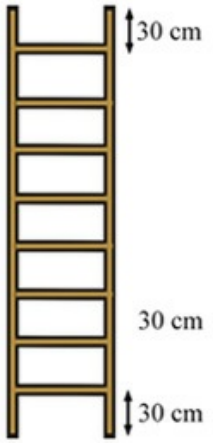
# Ladder patterns

**This task is about continuing a pattern and stating the rule for the pattern.**




The distance between each rung of a ladder is 30 cm, and there is an additional 30 cm at the top and bottom of the ladder, as shown in the diagram.

a) Complete this table, giving the lengths of ladders with different numbers of rungs (Do not count the thickness of the rungs):

| **Number of rungs** | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|
| **Length of ladder (cm)** | 150 | 180 | | | | |

b) Complete the following sentence to make a rule for calculating the length of a ladder with any number of rungs.

To get the length of a ladder, multiply the number of _____ by _____ and

then add _____.

c) Because it has to lean at an angle, a ladder will only reach to a height equal to $\frac{4}{5}$ of its length.
Mr Carpenter has a 10-rung ladder, and wants to step onto a roof 3 metres above the ground.
Show how to work out whether his ladder will be long enough.

Will his ladder be long enough? _____