



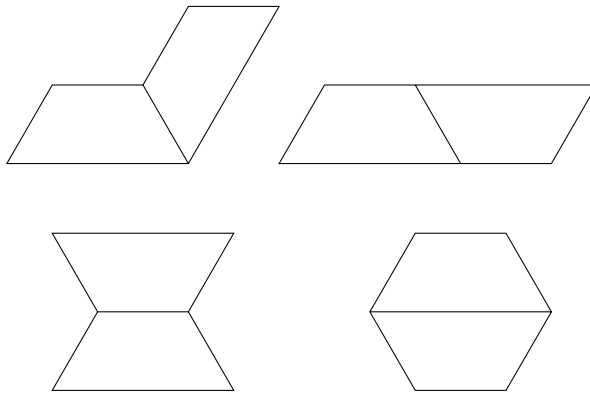
# AUSTRALIAN MATHS TRUST

Maths Challenge  
Upper Primary: Years 5–6  
Practice Problem

## UP1: Manipulating Trapeziums

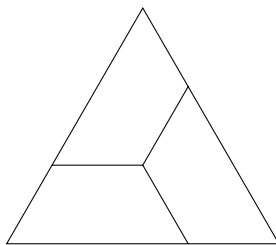
### Solutions

a



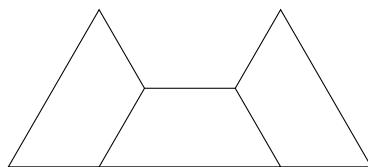
1

b The teacher can arrange three tables to fit exactly nine chairs. Here is one way to do this.



There are several other ways.

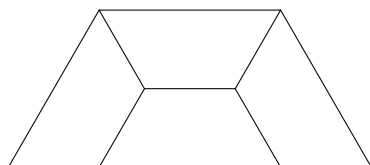
The teacher can arrange three tables to fit exactly 11 chairs. Here is one way to do this.



There are several other ways.

1

- c Here is one cluster of four tables that fits exactly ten chairs.

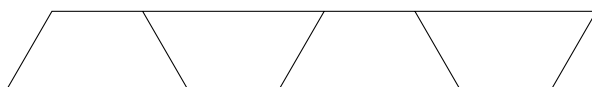


There are several other clusters.

**1**

- d One table fits five chairs. When an extra table is joined to a given cluster, at least two chairs must be removed: one from the cluster and one from the extra table. So the number of chairs overall increases by at most three. Thus a cluster of two tables fits at most eight chairs. Hence a cluster of three tables fits at most 11 chairs and a cluster of four tables fits at most 14 chairs.

The following cluster of four tables fits exactly 14 chairs. There are other clusters.



So the maximum number of chairs the teacher can fit around a cluster of four tables is 14.

**1**

## Discussion

1. This problem is a modification of one proposed by Lorraine Motterhead.
2. It involves placing identical trapeziums together to form shapes of specified perimeters.

## Extensions

1. Show how 12 chairs can fit exactly around a cluster of four tables.
2. Show how 15 chairs can fit exactly around a cluster of tables in the shape of an isosceles trapezium.