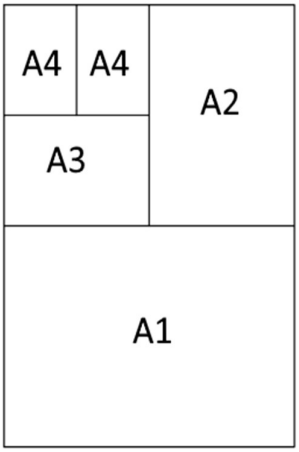
Fit for Photocopying

You may be familiar with the standard paper size A4. Two sheets of A4 fit together to make a sheet of A3, two sheets of A3 fit together to make a sheet of A2, and so on.



A sheet of A0 has an area of 1 square metre.

Each member of the "A" paper size family is an enlargement of the others - they are similar shapes.

What scale factor of enlargement would you need to scale the side lengths of A4 to A3?
Or A4 to A2?
Or A4 to A1?
Or A4 to A0?

What would the scale factors be if you scaled from the larger sheets to the smaller ones?

Can you write down an expression for the linear scale factor of enlargement needed to get from A(n) to A(m)?
You may wish to consider separately the case where $n > m$ and where $n < m$.

On a photocopier, approximately what percentage would you need to scale by in order to photocopy an A3 poster onto A4 paper?

Here are some challenging questions to consider:

Can you express the largest of the longer side of a sheet of paper from the A family in terms of its shorter side?

Given that a sheet of A0 has an area of 1 square metre, can you work out its dimensions?
Can you use this together with your previous results to work out the exact dimensions of a sheet of A4 paper?

Can you find a consistent way to define A(-1) and other negative paper sizes?

Can you find a consistent way to define A($\frac{1}{2}$), and other fractional paper sizes?