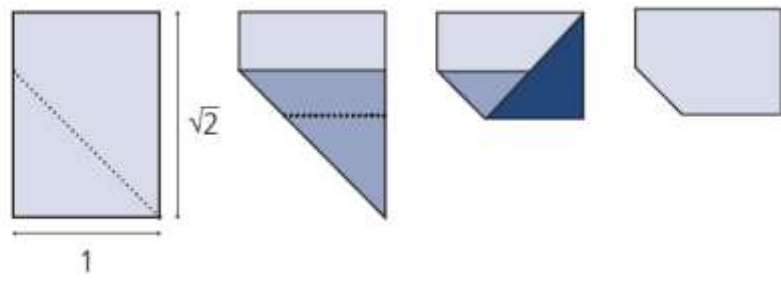
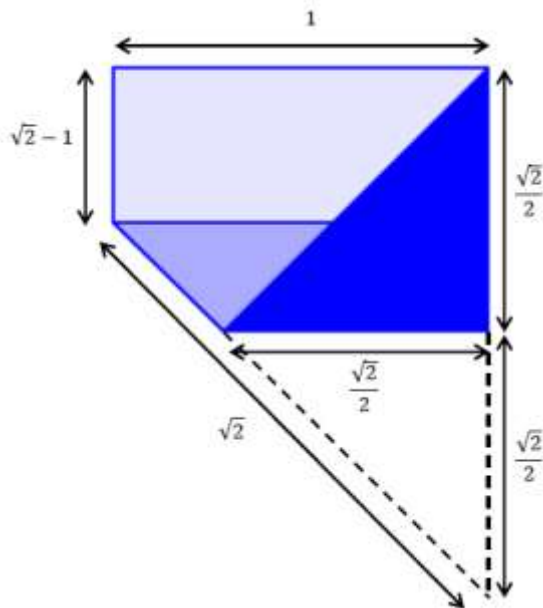


An A4 sheet of paper has side lengths in the ratio $1:\sqrt{2}$. If the paper is folded as shown in the diagram, what is the perimeter of the resulting pentagon?



A good starting point is to mark some known lengths. It helps that there are several 45° isosceles right-angled triangles to work with.



The only side that takes a bit of thought is the shortest side.

It can be calculated by $\sqrt{2} - \text{“something”}$. That amount can be calculated using trigonometry or Pythagoras’ theorem: $\sqrt{\left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2} = \sqrt{\frac{4}{4}} = 1$.

The shortest length is therefore $\sqrt{2} - 1$

The perimeter is $1 + (\sqrt{2} - 1) + (\sqrt{2} - 1) + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = 3\sqrt{2} - 1$