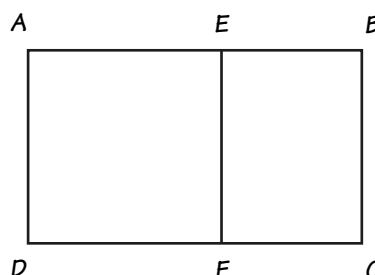# FURTHER SURDS PROBLEMS
CUTTING SQUARES FROM RECTANGLES

- A golden rectangle is a rectangle which stays the same shape when the largest possible square is cut from it. In other words, if the rectangle **ABCD** is golden and if **AEFD** is a square then **ABCD** is similar to rectangle **EBCF**.
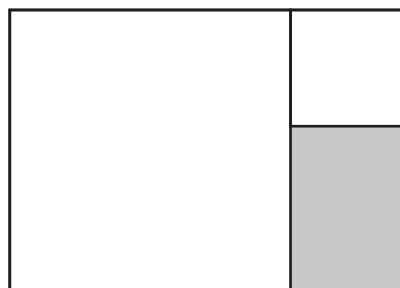

Prove that the ratio of the sides of the rectangle **ABCD** is $\dfrac{1 + \sqrt{5}}{2}$

The number $\dfrac{1 + \sqrt{5}}{2}$ is often written as φ.

Show that the difference between φ and $\dfrac{1}{\varphi}$ is **1**.

- A piece of A4 paper has sides which are in the ratio $\sqrt{2} : 1$.

Suppose the largest possible square is cut from the paper and then the process is repeated.

Prove that the shaded rectangle left is similar to the original A4 rectangle.

Now investigate a rectangle that has sides in the ratio $\sqrt{3} : 1$ in the same way. How many squares need to be cut from this rectangle before the rectangle left is similar to the original rectangle?

STUDENT RESOURCE

1—Indices and surds

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