PAPER

HELPER

Conversions, Divisions and Shapes

Collected, edited and diagrammed
by Guy Loel

Acknowledgment

In this booklet we tried to collect the major tools an origami folders needs when folding a model which does not start from a square.
How to convert a square to US letter size, or to make a clean duo color A4 from Kami are two examples.

We collected techniques from people and sites, and we wish to thank them for developing those.
Joseph Wu
Douglas Philips
Maria Sinayskaya
Thoki Yenn
Origami Resource Center

We are sorry if we missed anyone, please contact us and we will rectify it immediately.

Furthermore, this will be an ongoing project, as we will continue to add more and more tools, such as n-side polygons, for n=7 to 12. If you have requests for other tools, please send us an email to iorigamiproductions@gmail.com

As our valued member, you will get this booklet as part of our future events.

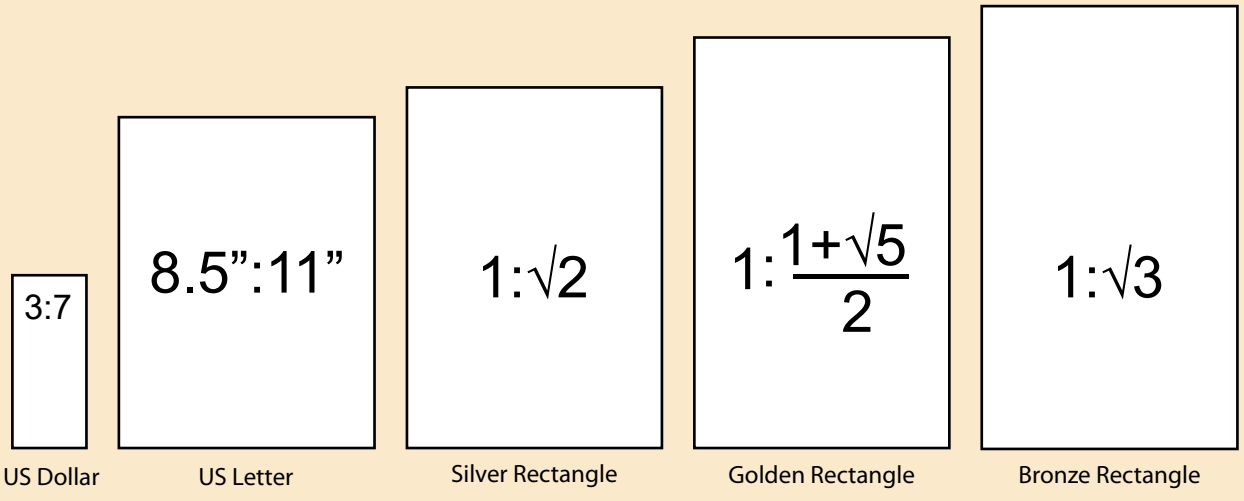
We thank you for sharing your love for origami with us, and we are sure you will find this booklet useful.

Contents

Paper Conversions

In origami, most of the time, we use square papers which are really easy to come by. It is also pretty simple to cut a square in case we run out of Kami papers, but once in a while we may need a paper with different proportion. These are the most common rectangles we usually need:

US Dollar Bill
Letter
Silver Rectangle
Golden Rectangle
Bronze Rectangle



US Dollar Bill Proportions

Money Origami is the art of folding dollars into various shapes and designs. Creating origami with money is great for those looking to gift money more creatively.

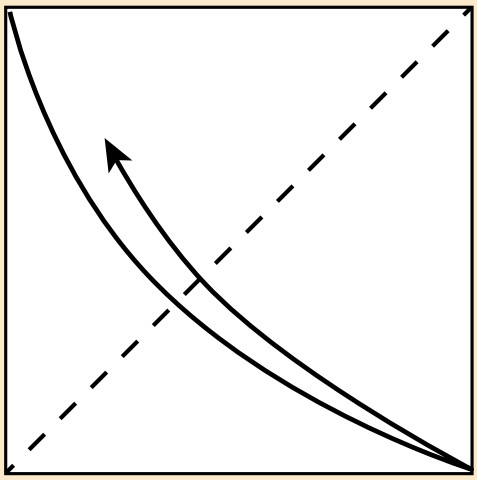
US dollar bill dimensions are 6.14 ” × 2.61″ (156.1mm x 66.3mm). Its ratio of length to width is approximately 7:3.

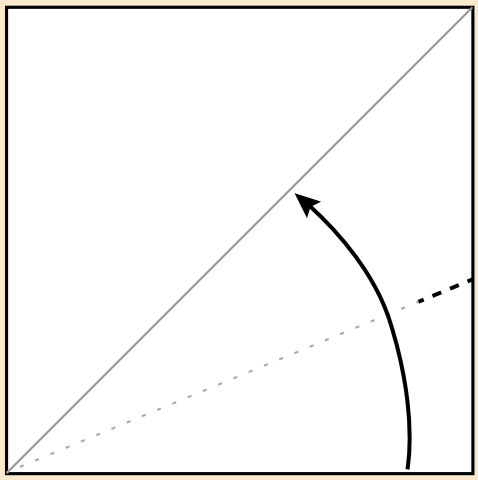
US Dollar

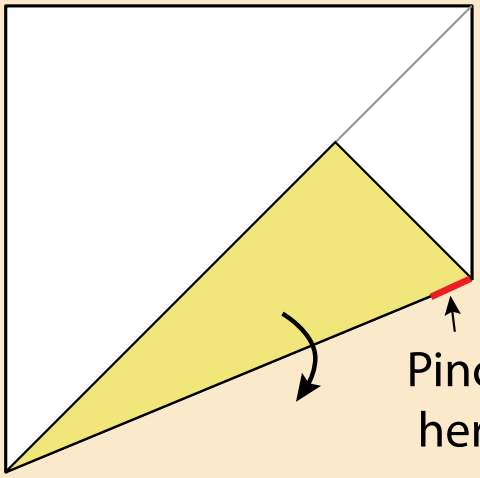
For practice purposes, it is useful to make rectangles of the same proportion as a dollar bill. These sheets are larger and will allow you to “save” your dollar bills for your final fold.

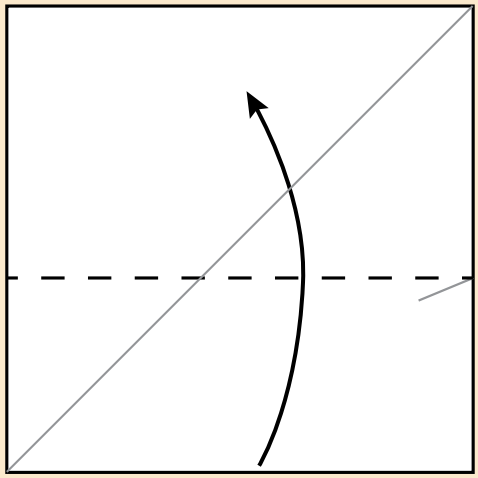
In the following chapter we will convert square and rectangle papers into US dollar proportions rectangles.

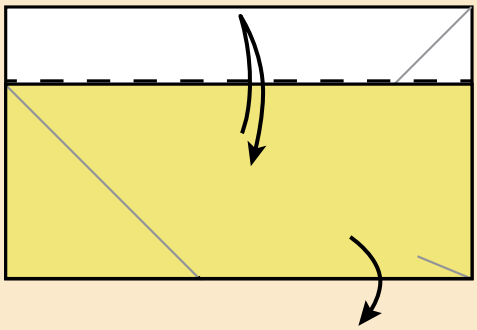
US Dollar Bill from a Square

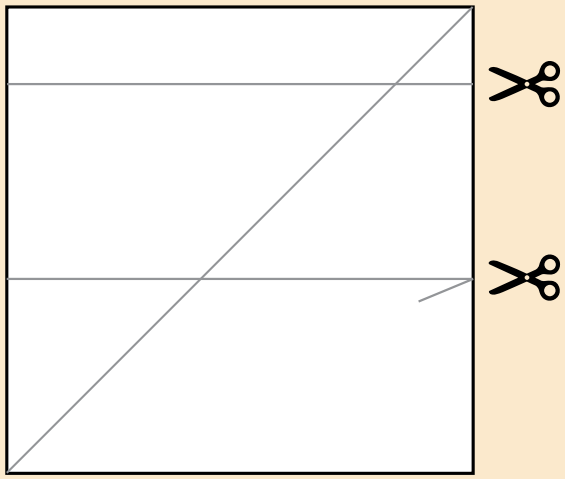










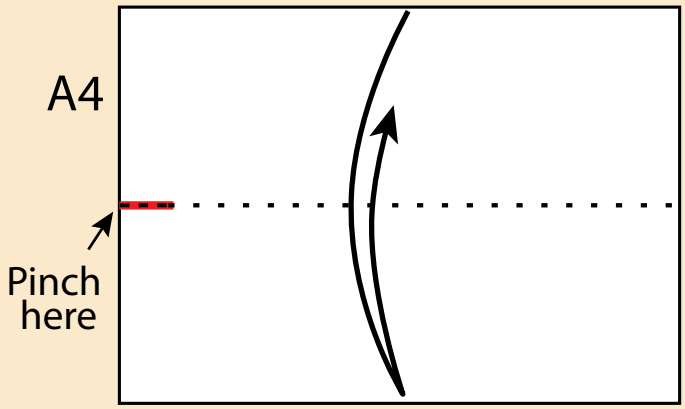


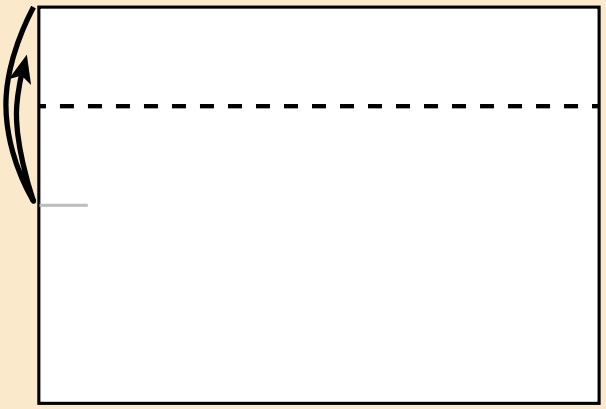
Discard

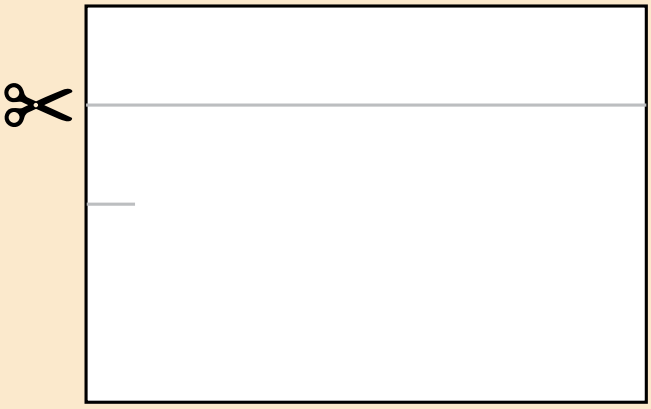
Dollar bill ratio
7:3

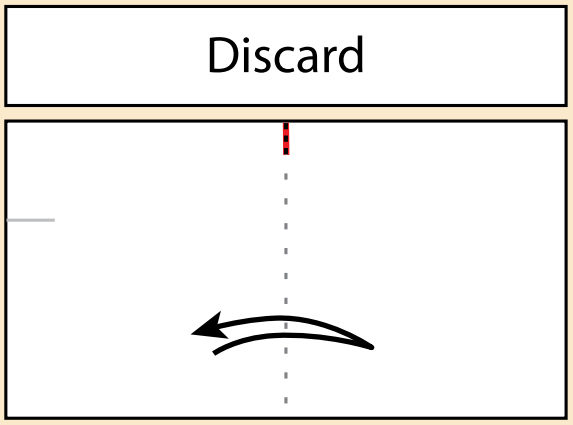
Dollar bill ratio
7:3

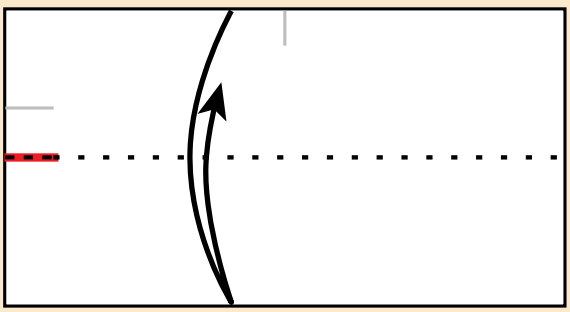
US Dollar Bill from A4

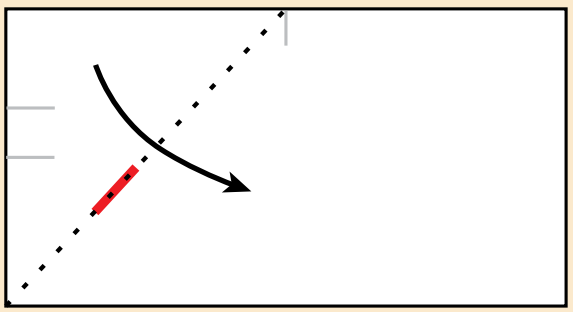


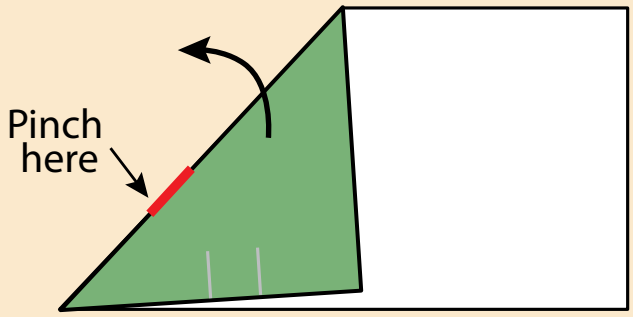


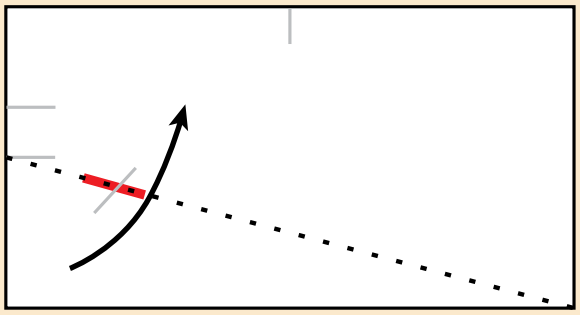


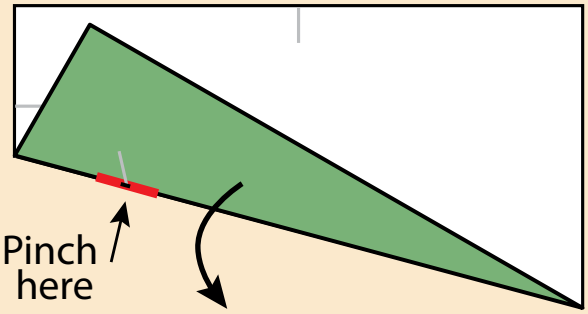


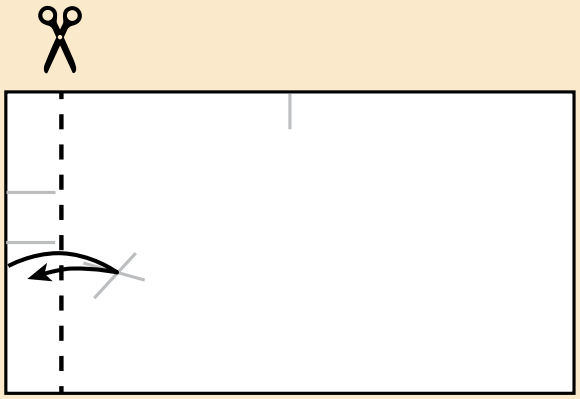




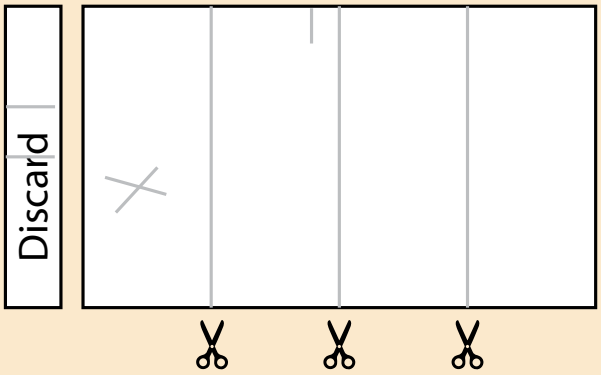


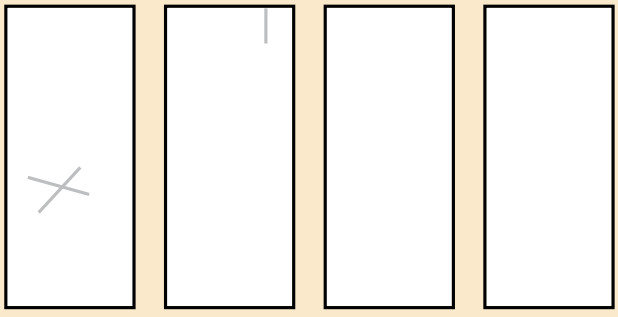






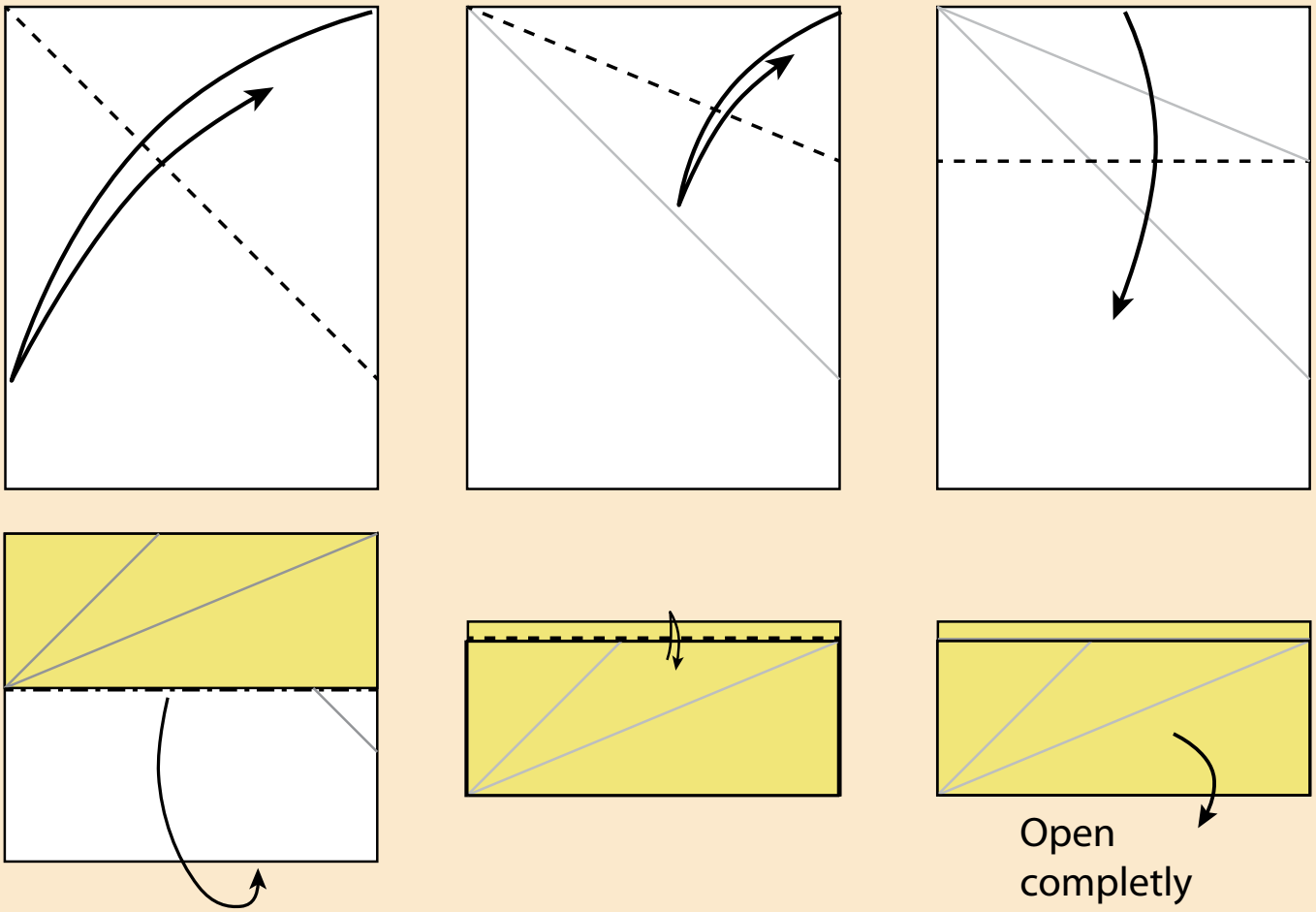
Divide into 4 equal parts

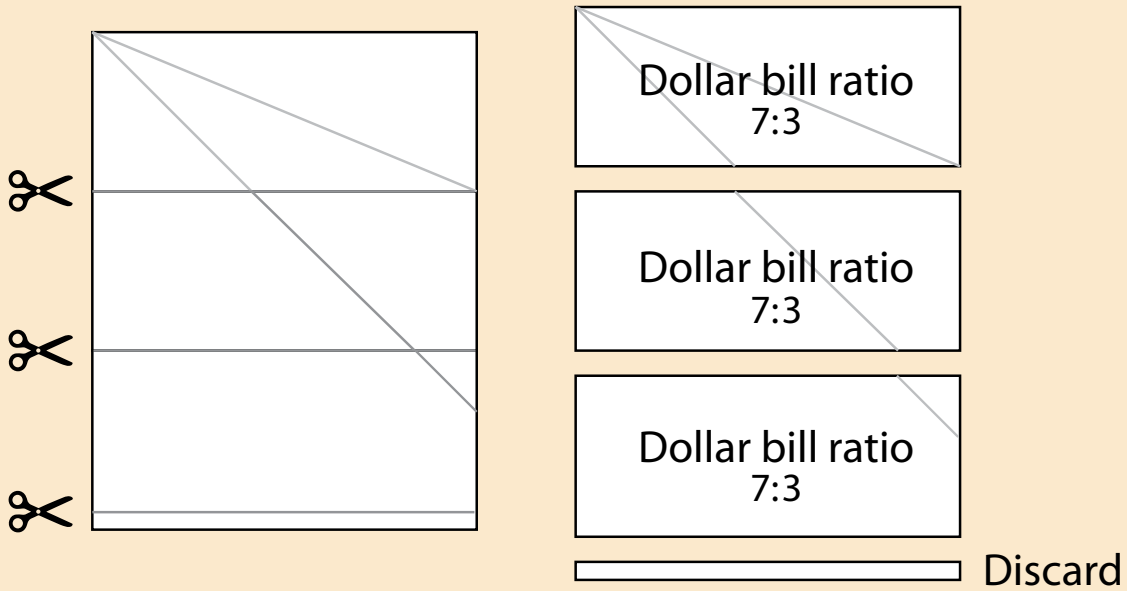




* The resulting 4 sheets are an actual dollar bill size.

US Dollar Bill from Letter-Sized Paper

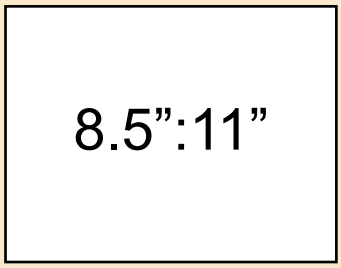




* The result is 7:3 in ratio but bigger than an actual dollar bill

Letter Paper Size

(ANSI) Letter is a paper-size standard defined by the **A**merican **N**ational **S**tandards **I**nstitute. It is commonly used in the US and Canada. It measures 8.5 by 11 inches (215.9 by 279.4 mm) and is similar in use to the A4 paper standard used by most other countries.



US Letter

Special Property
Although there is no special property to this ratio American still loves it.

**The precise origins of the dimensions of US letter-size paper are unknown.*

In the following chapter we will convert square and rectangle papers into US Letter proportions rectangles.

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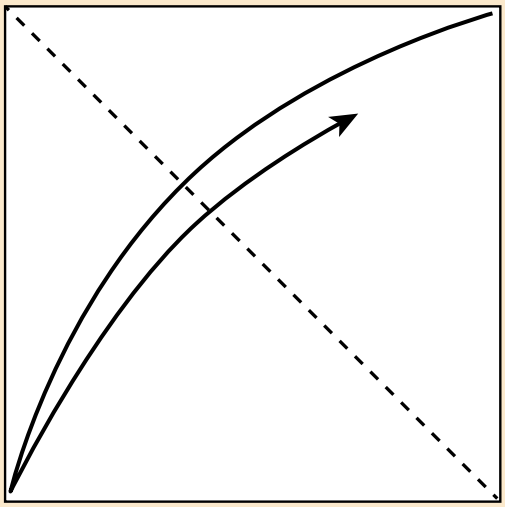
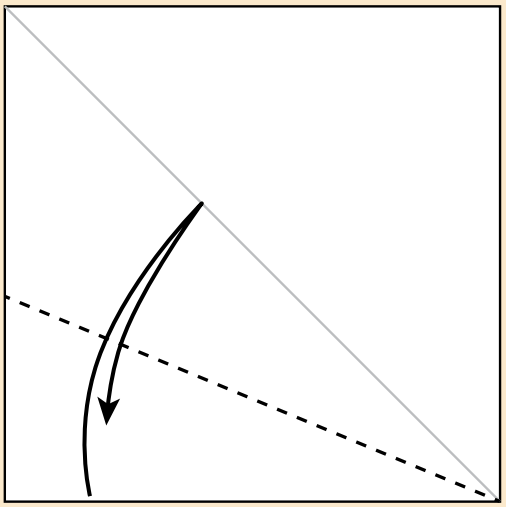
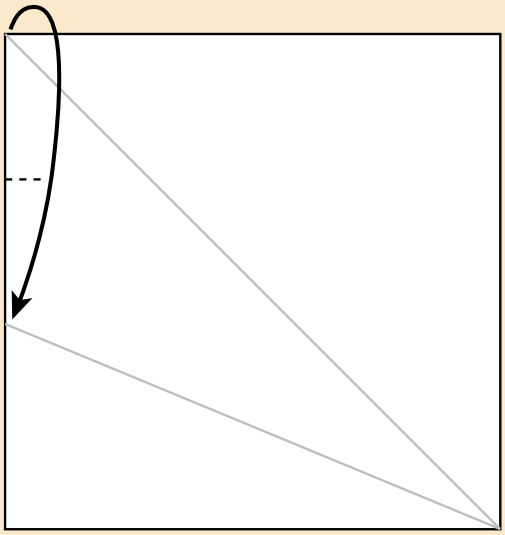
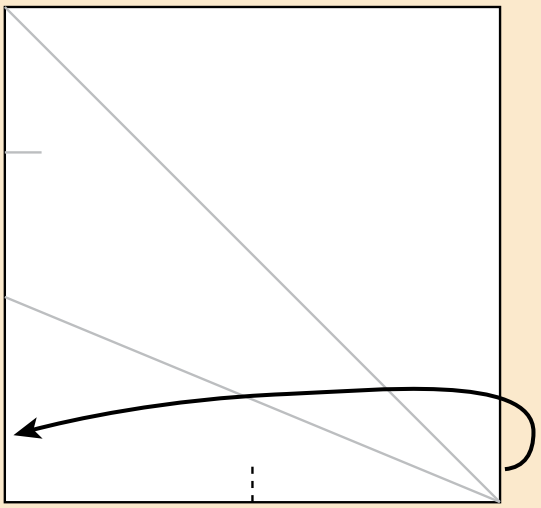
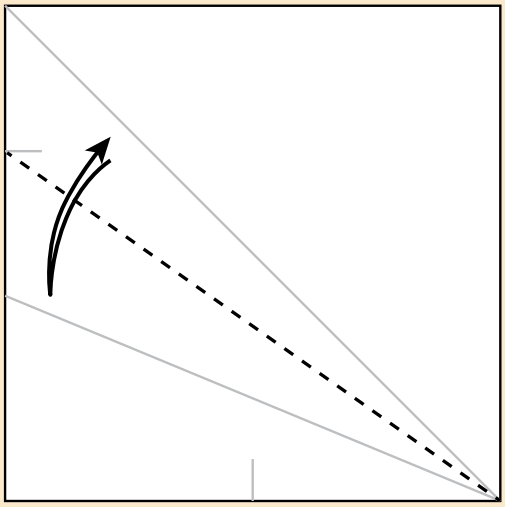
Letter-Size from a Square

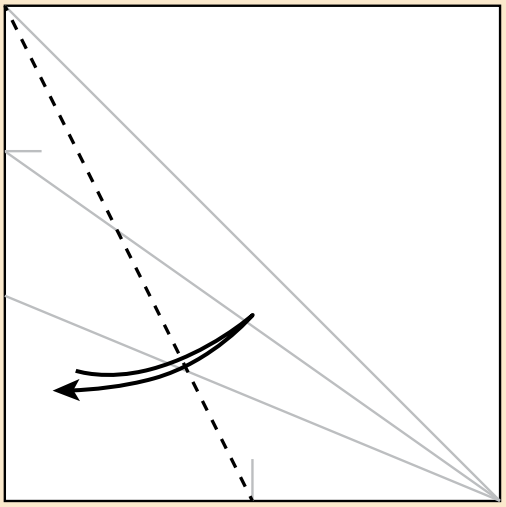


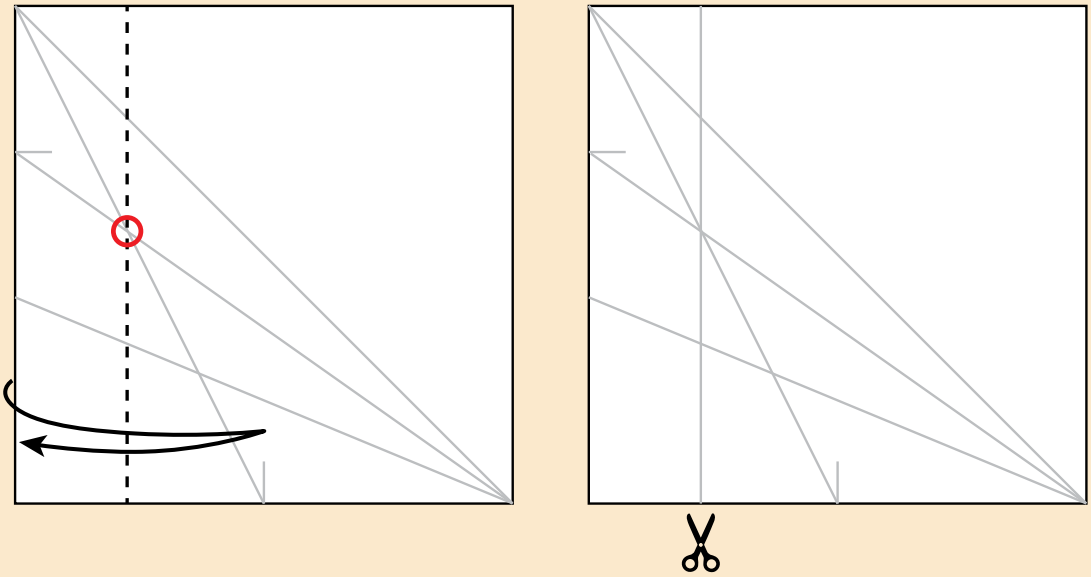


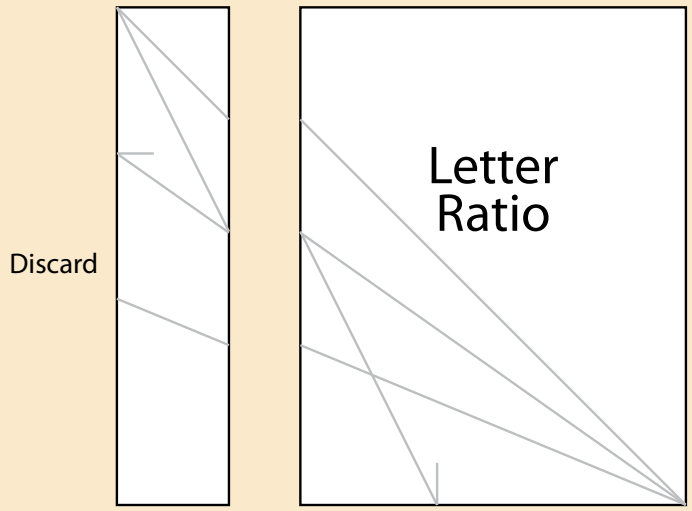




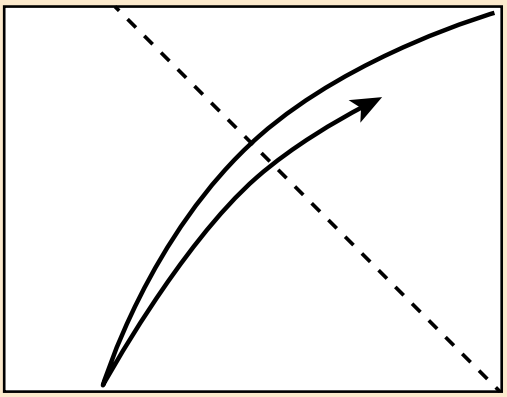


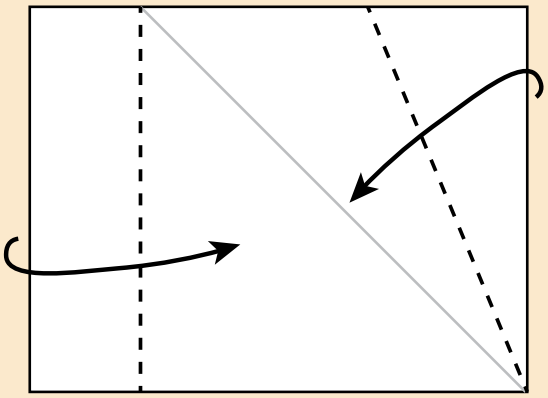


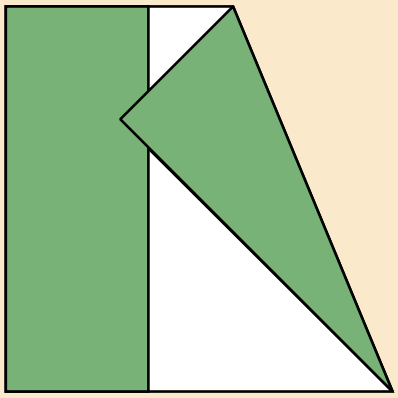


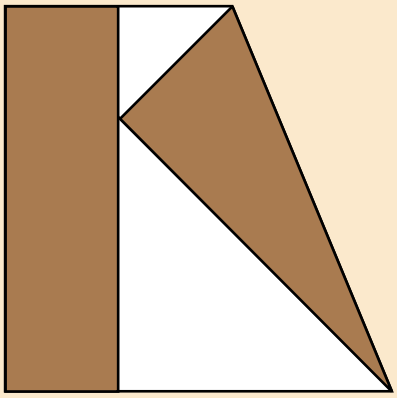

Discard
Letter
Ratio

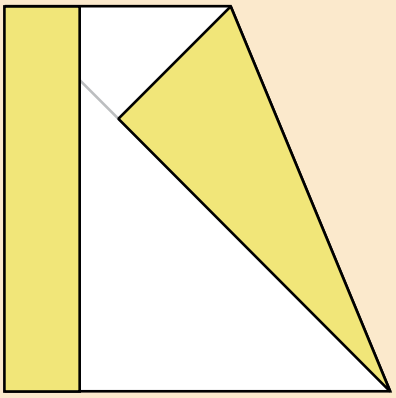
Letter-Size from any Rectangle

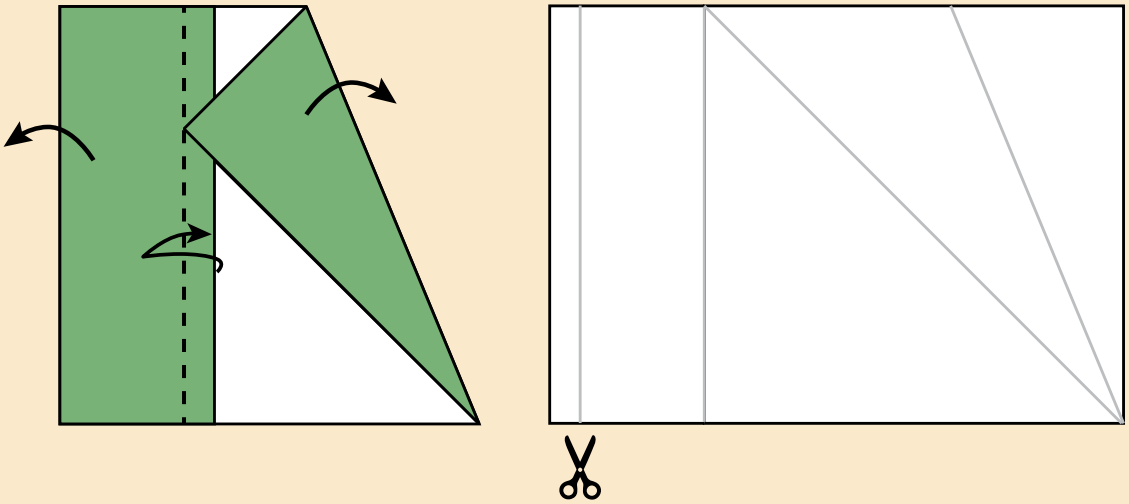




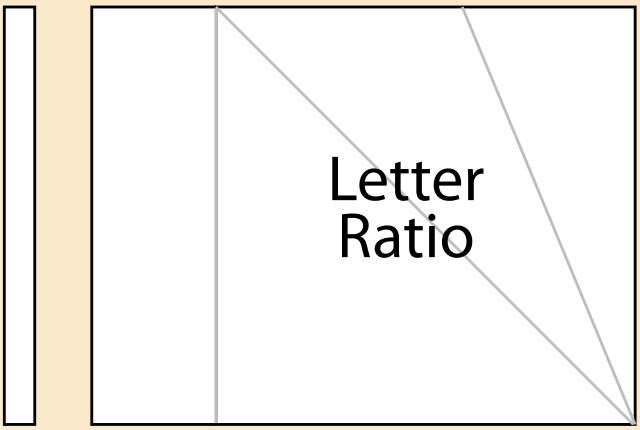


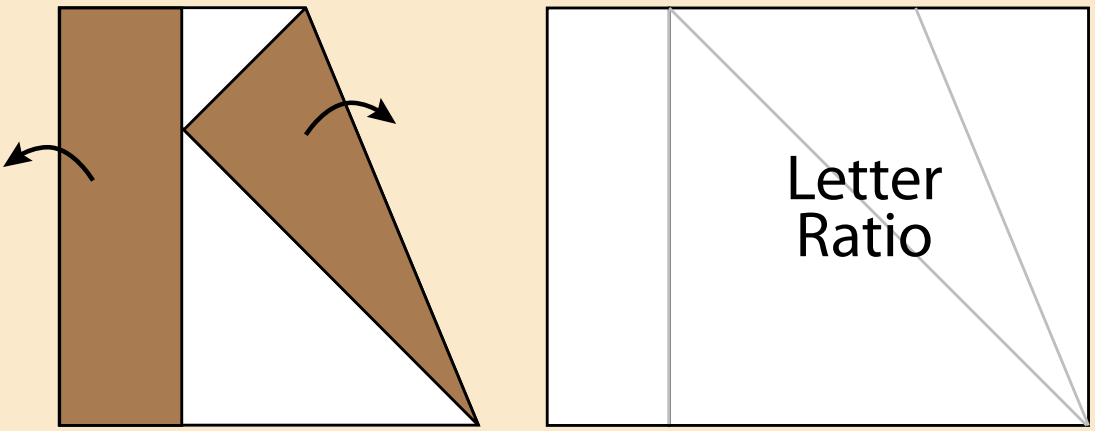


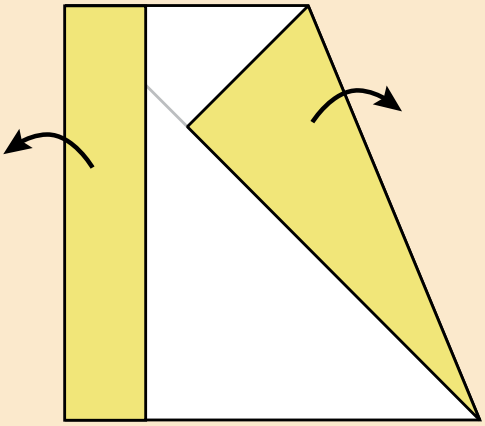


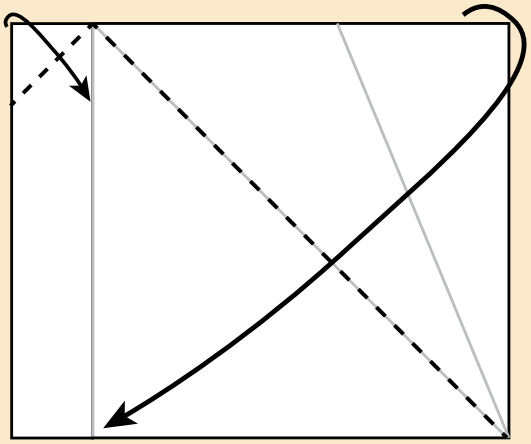


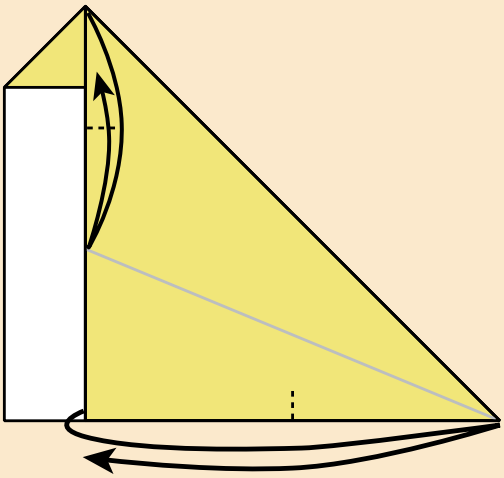
Discard











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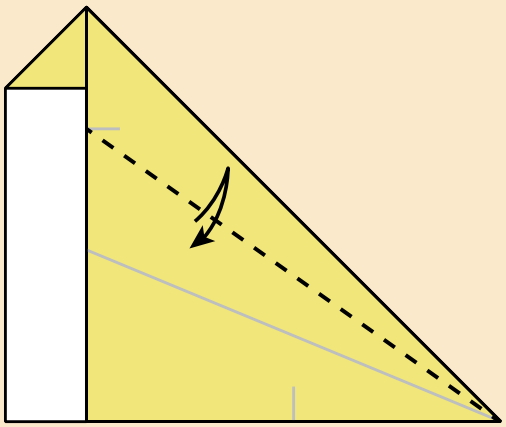

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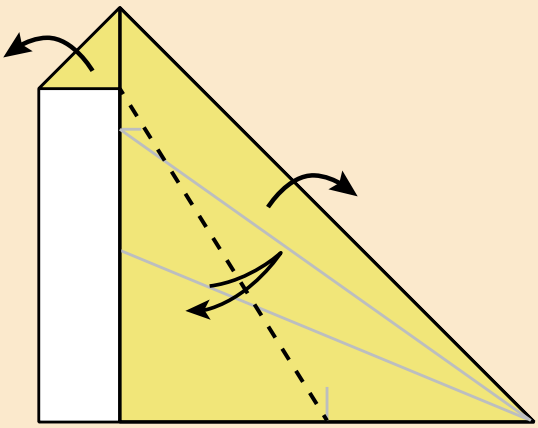

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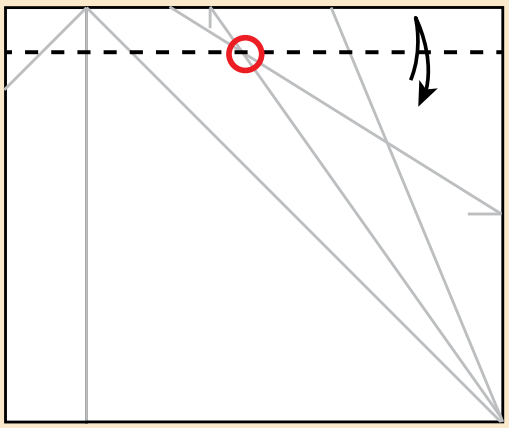
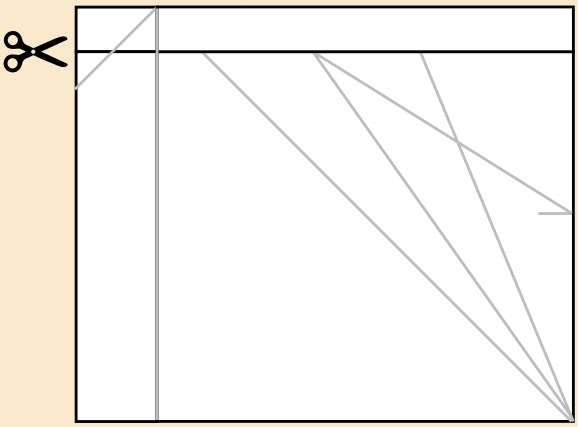
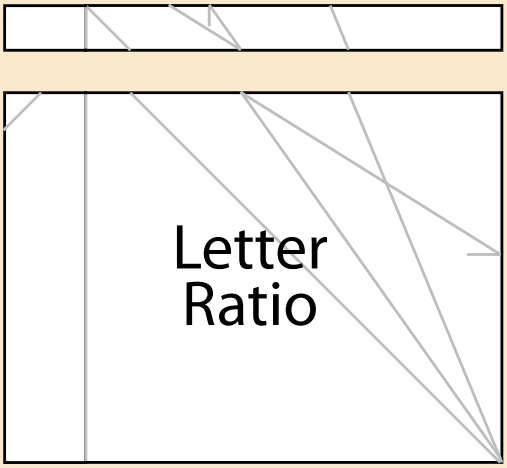


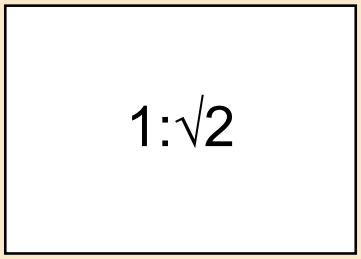
Discard





Silver Rectangles (A-Ratio Paper)

The International Standard A-series papers are used around the world with the exception of the USA and Canada. The A-series papers are examples of silver rectangles and have width to length ratios of 1 to $\sqrt{2}$.

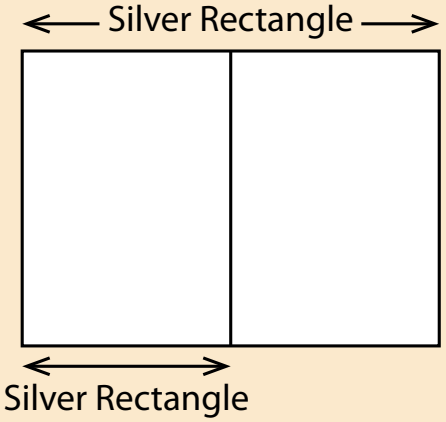


Silver Rectangle

Special Property

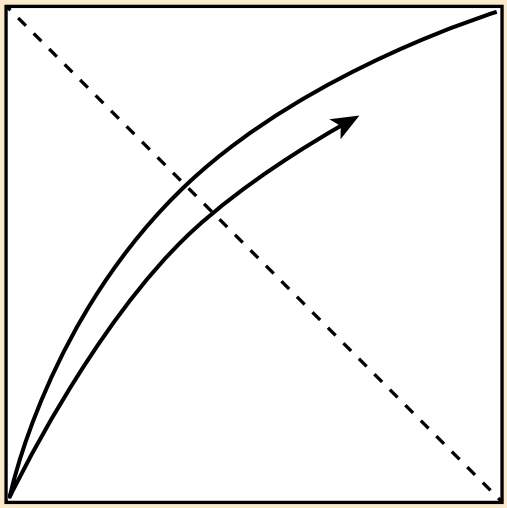
If you cut the paper in half crosswise, the two resulting pieces are also of the ratio 1:$\sqrt{2}$.

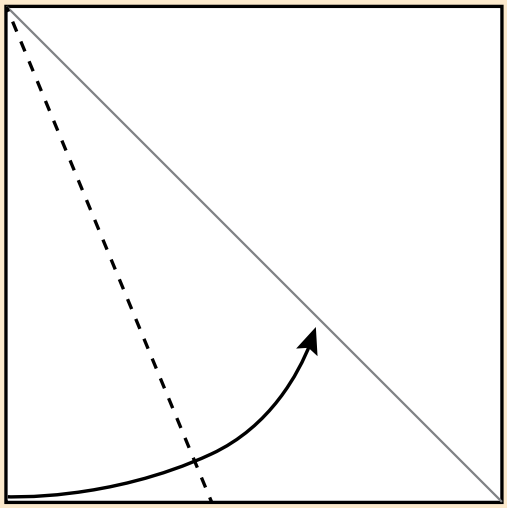
If you cut the A4 in half, the pieces are now called A5. You can cut the paper in half repeatedly and the resulting rectangles will all have the silver ratio.

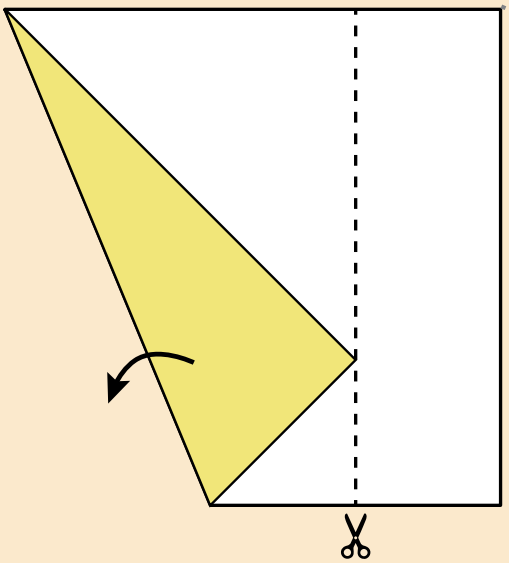


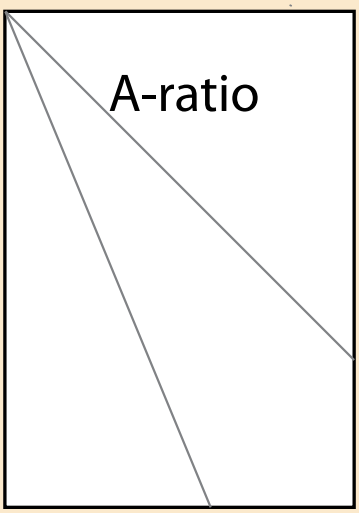
Some origami models use A-size paper instead of a square.
In the USA and Canada, A-series papers are hard to come by. The rest of the world use the A4 paper mostly as copy/printer paper so a duo colour A-size is also hard to find.
In the following chapter we will use square Kami or rectangle craft to get duo-colored A-size papers.

Silver Rectangle from a Square

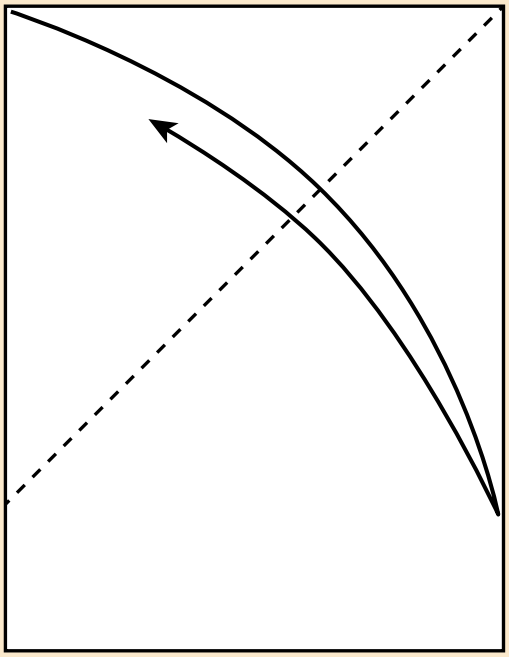


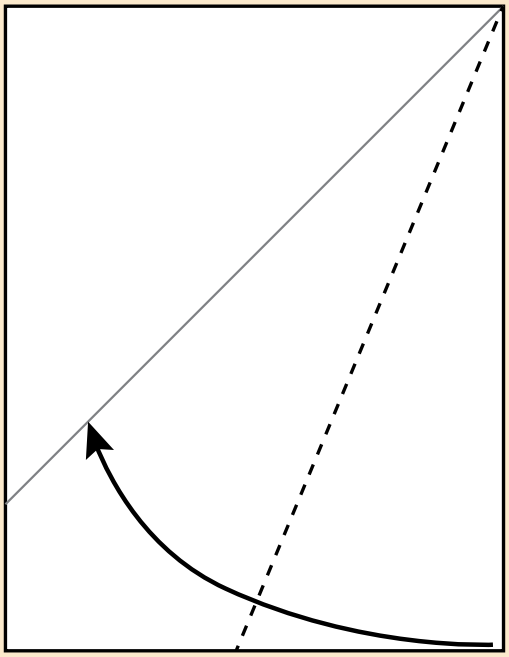


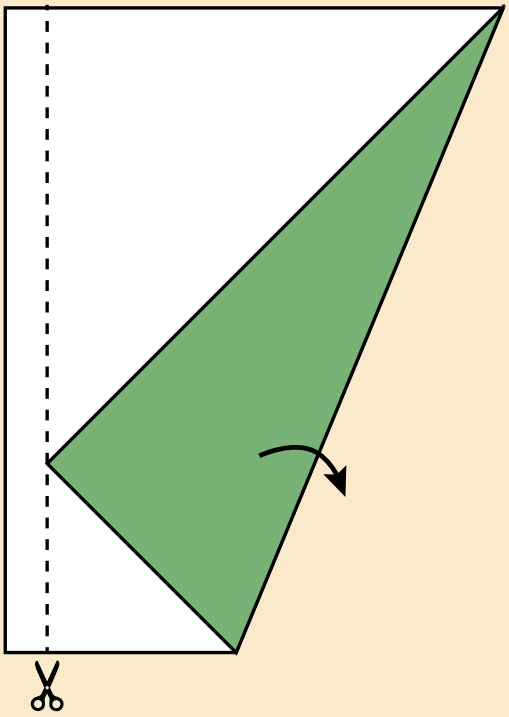


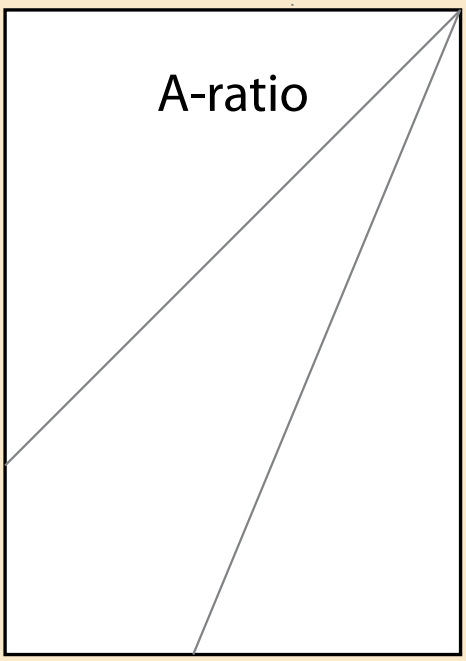


Silver Rectangle from Letter-Sized Paper

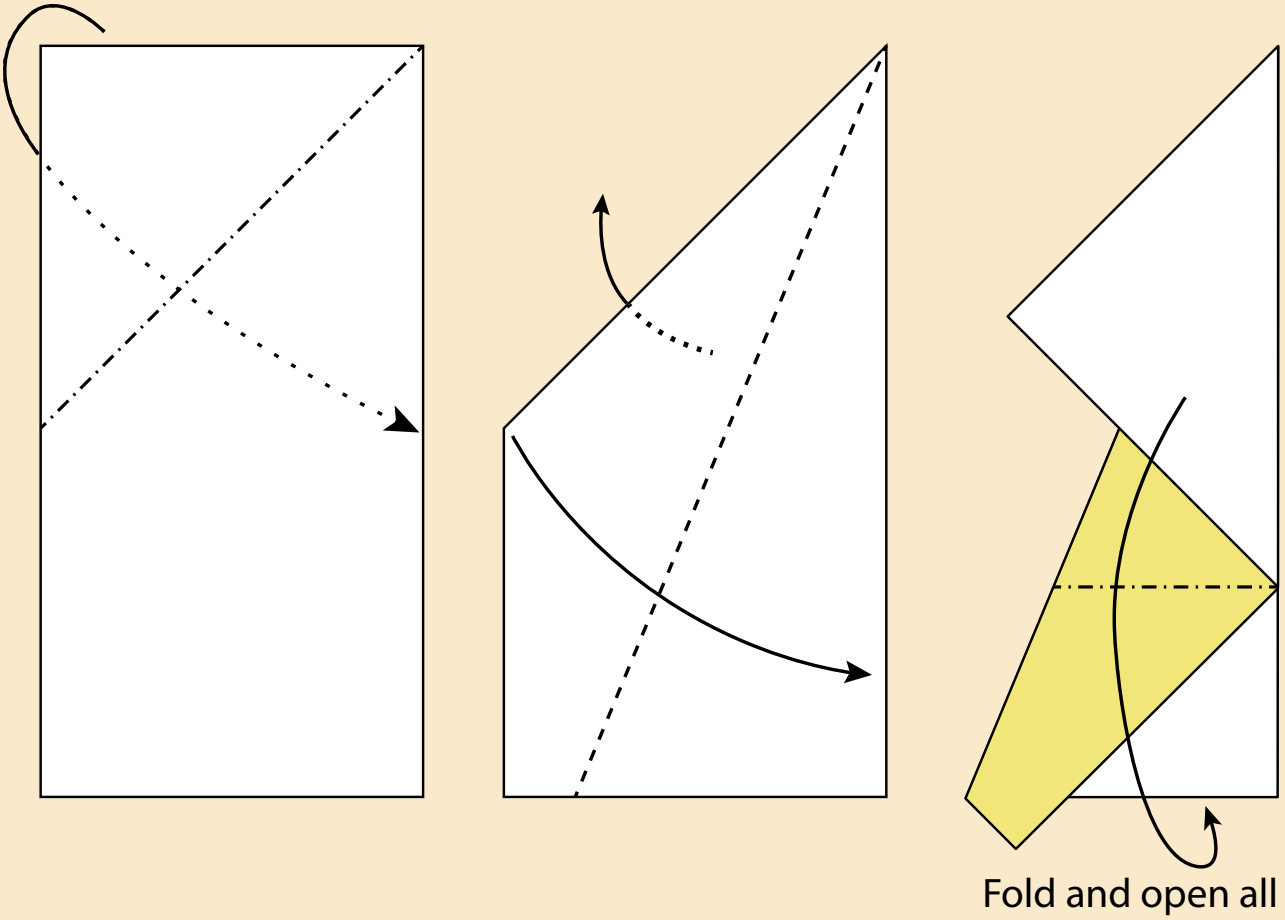


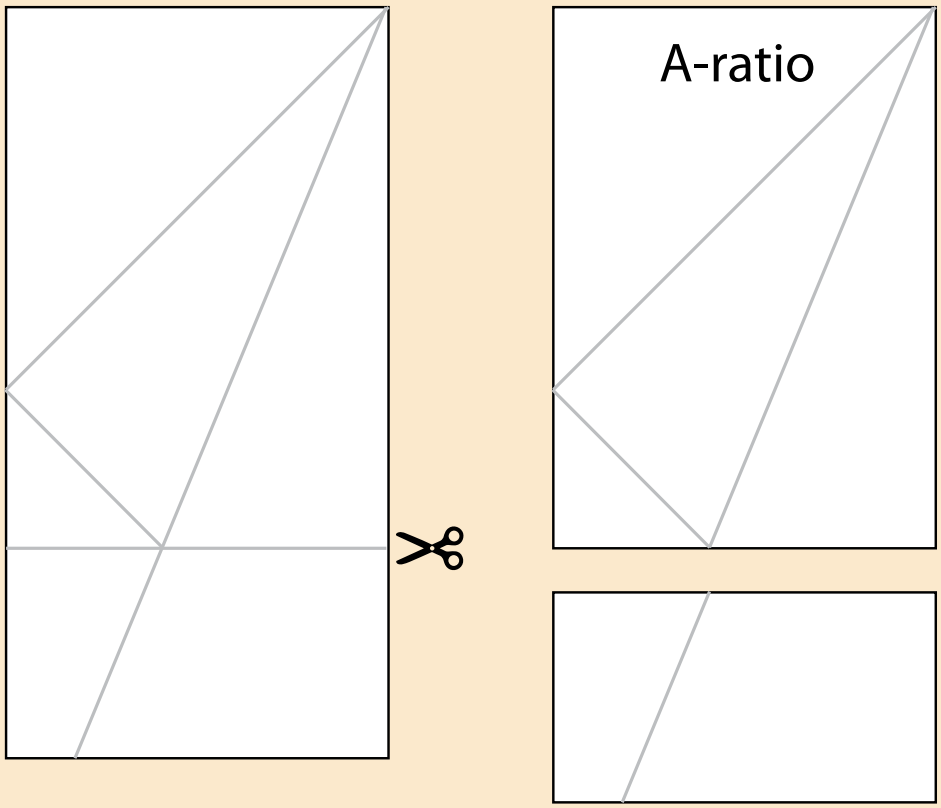




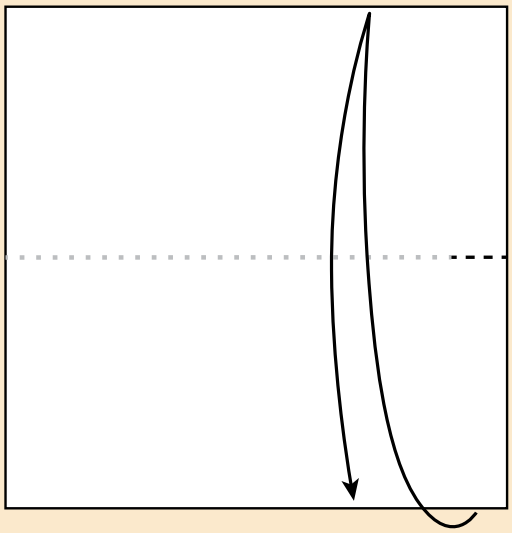


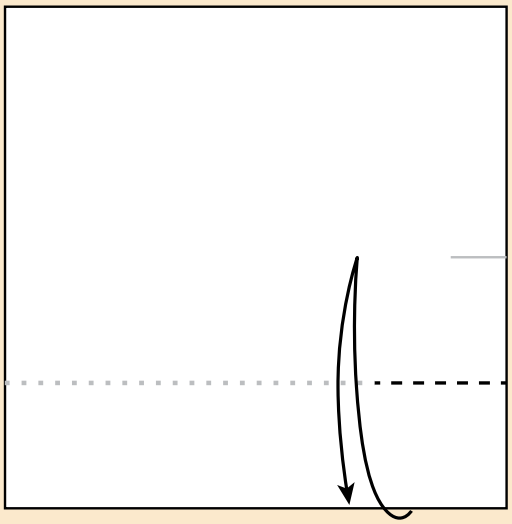
Silver Rectangle from a Long Rectangle

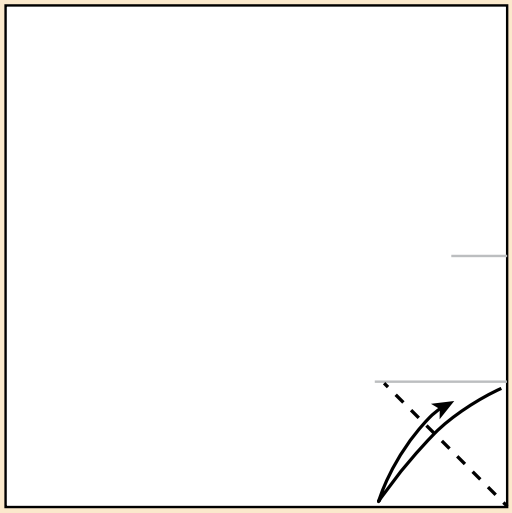


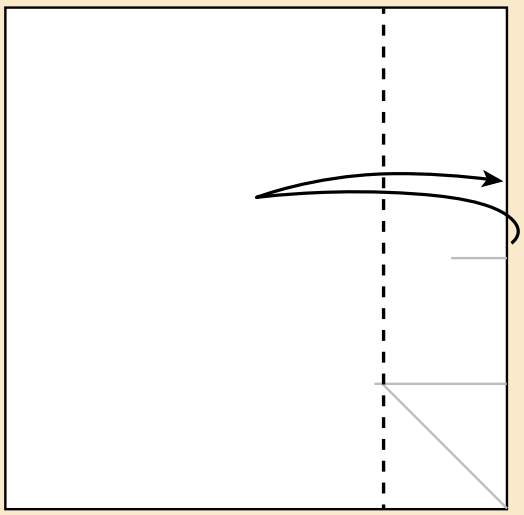


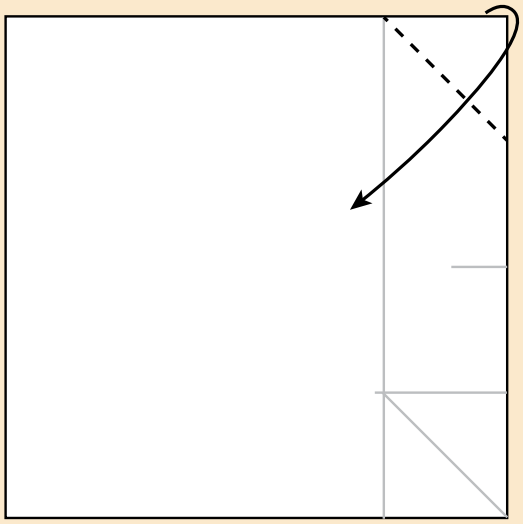
Creaseless Silver Rectangle from a Square

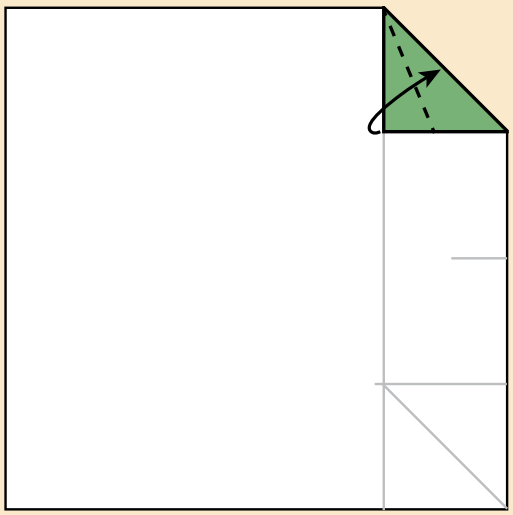


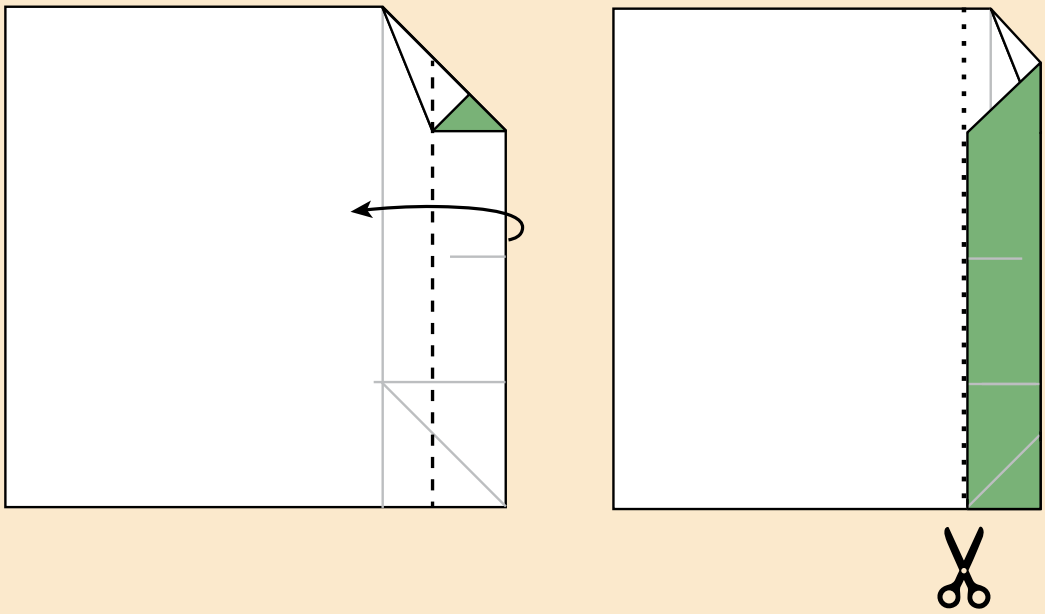






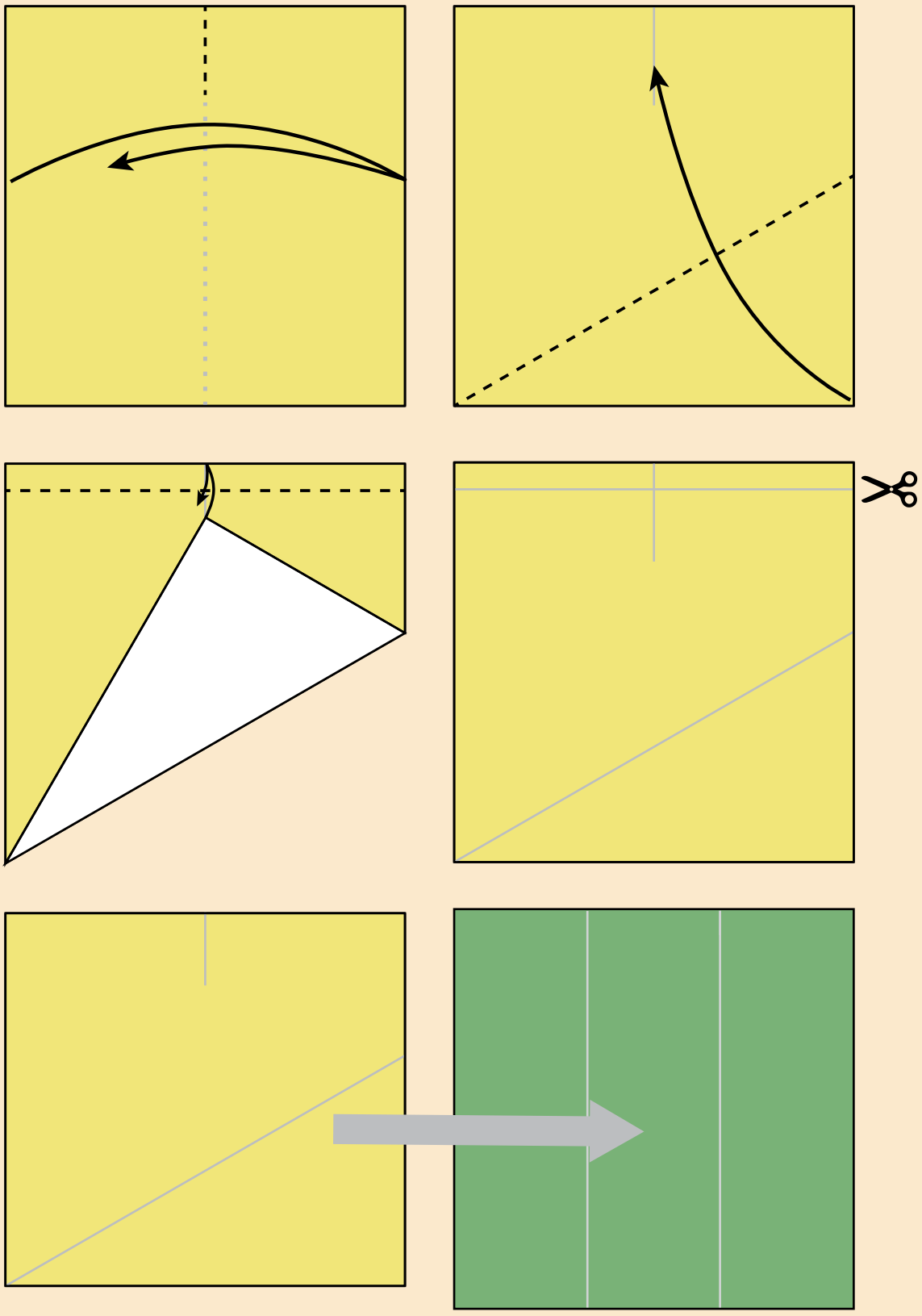




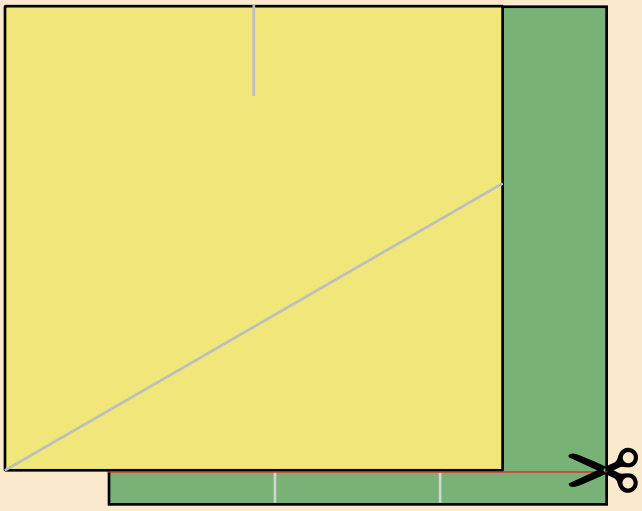


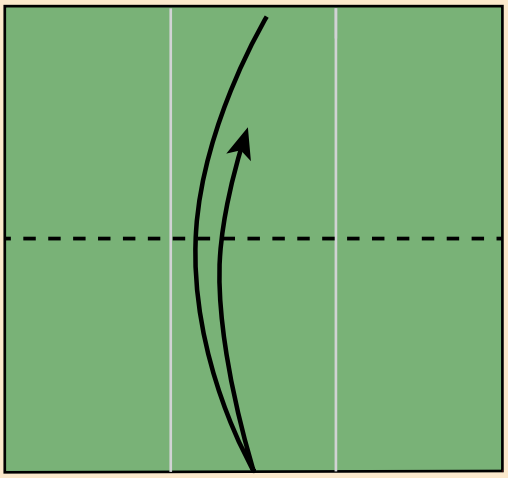
Clean
A-ratio

Creating 6 Silver Rectangles from a Square

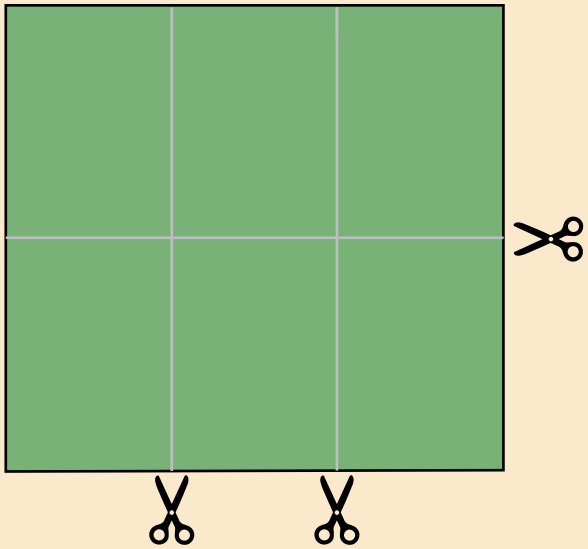


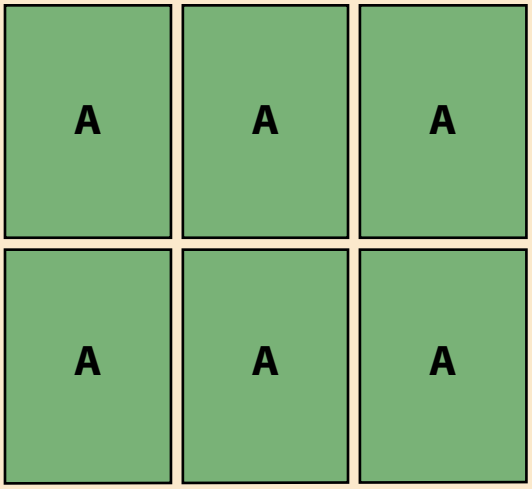
Place the template on a second sheet divided into thirds





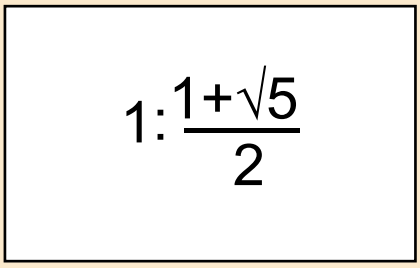
Cut the second sheet
according to the template





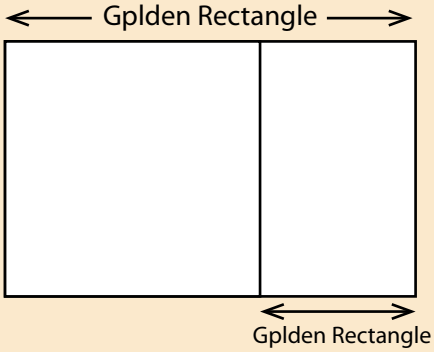
Golden Rectangle

The golden rectangle is not commonly used in origami.
The ratio of the sides is 1:1.61 or in fraction format:



Golden Rectangle

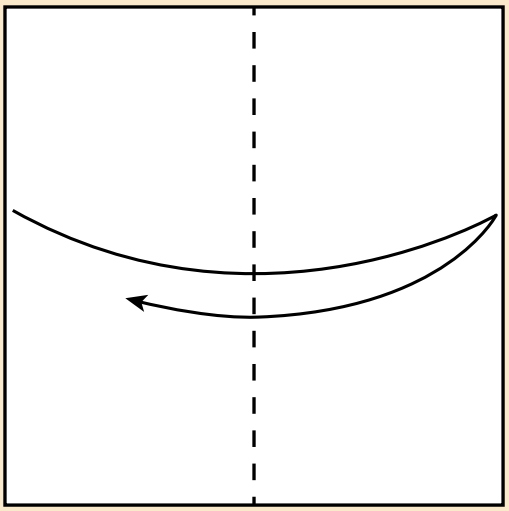
Special Property
If you remove a square from a golden rectangle, the left-over shape is also a golden rectangle with ratio 1:1.61.

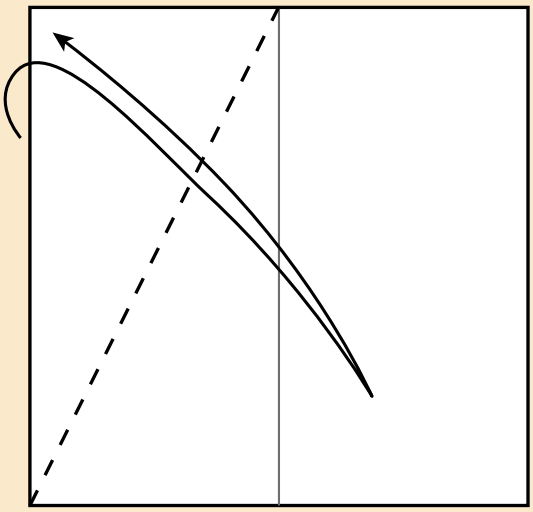


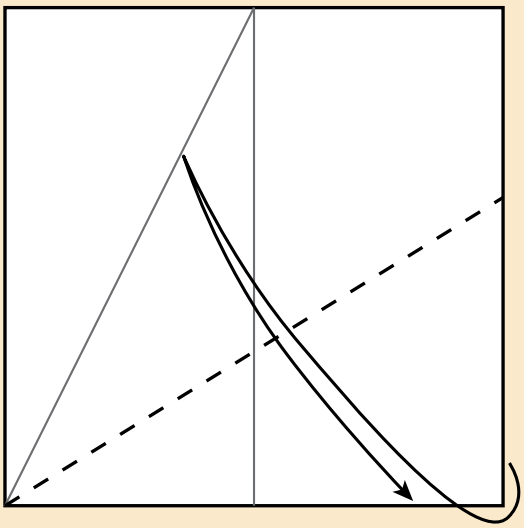
**The golden rectangle is also found in nature and used in art because it is thought to be visually pleasing and harmonious.*

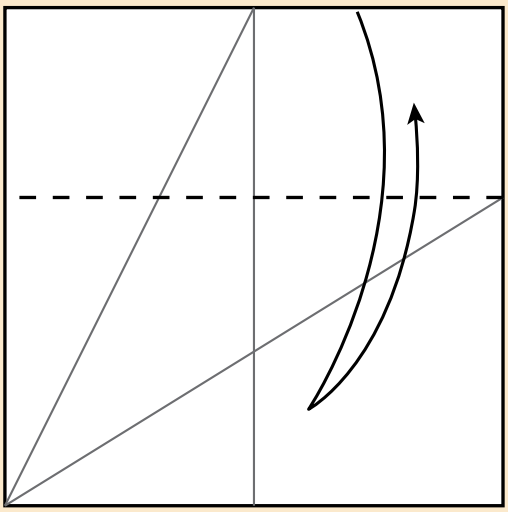
In the following chapter we will convert square and rectangle papers into golden rectangles.

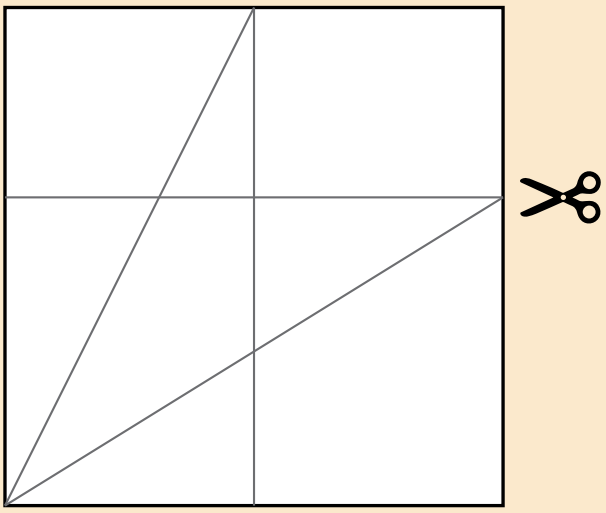
Golden Rectangle from a Square

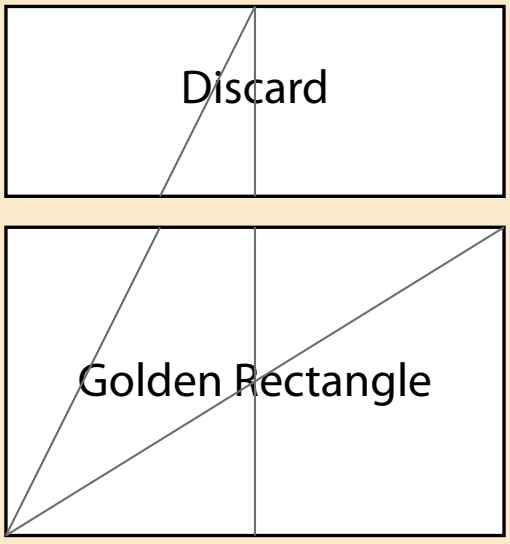




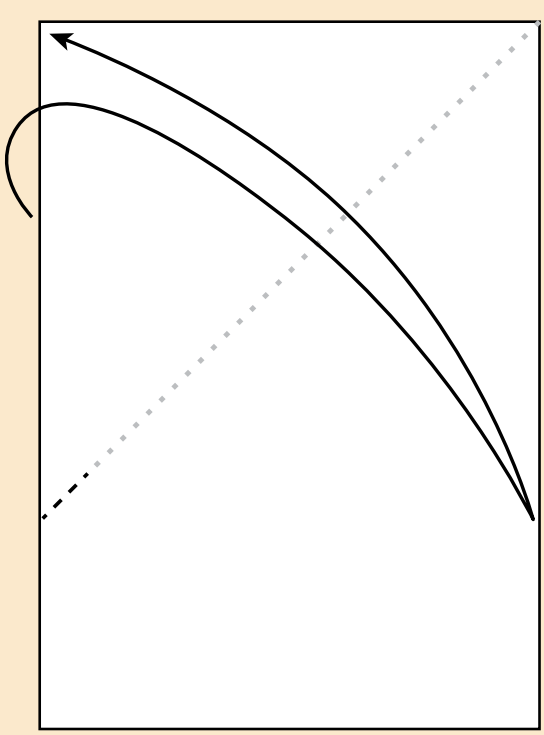


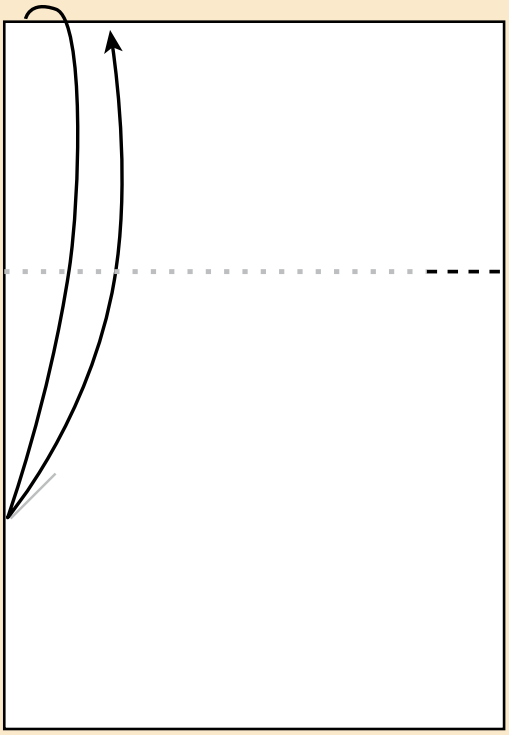


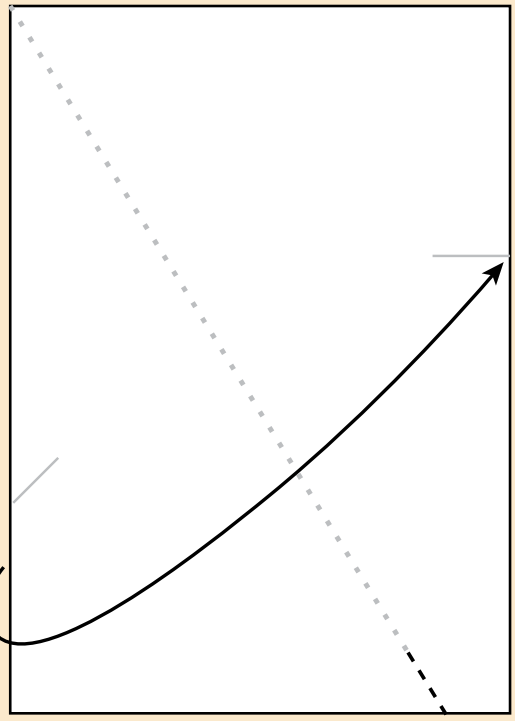


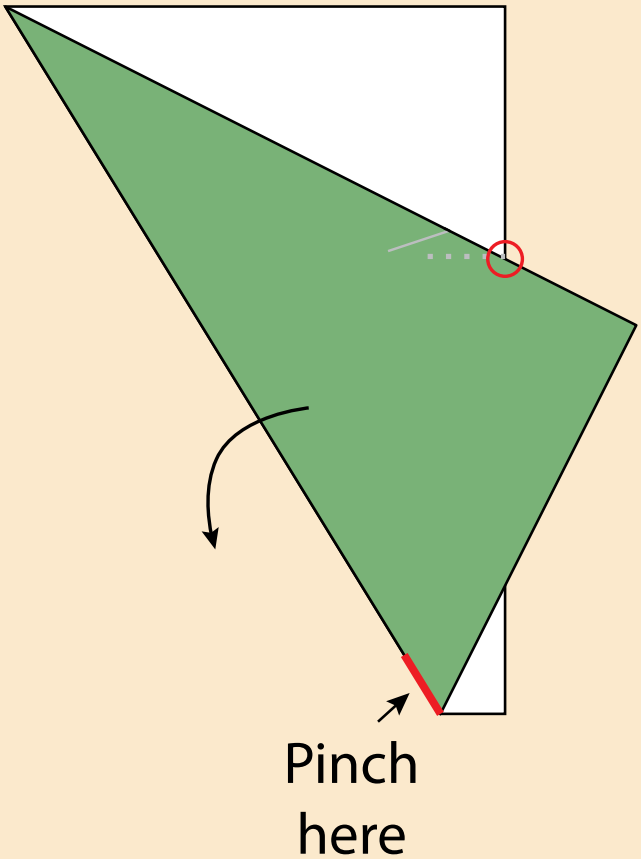


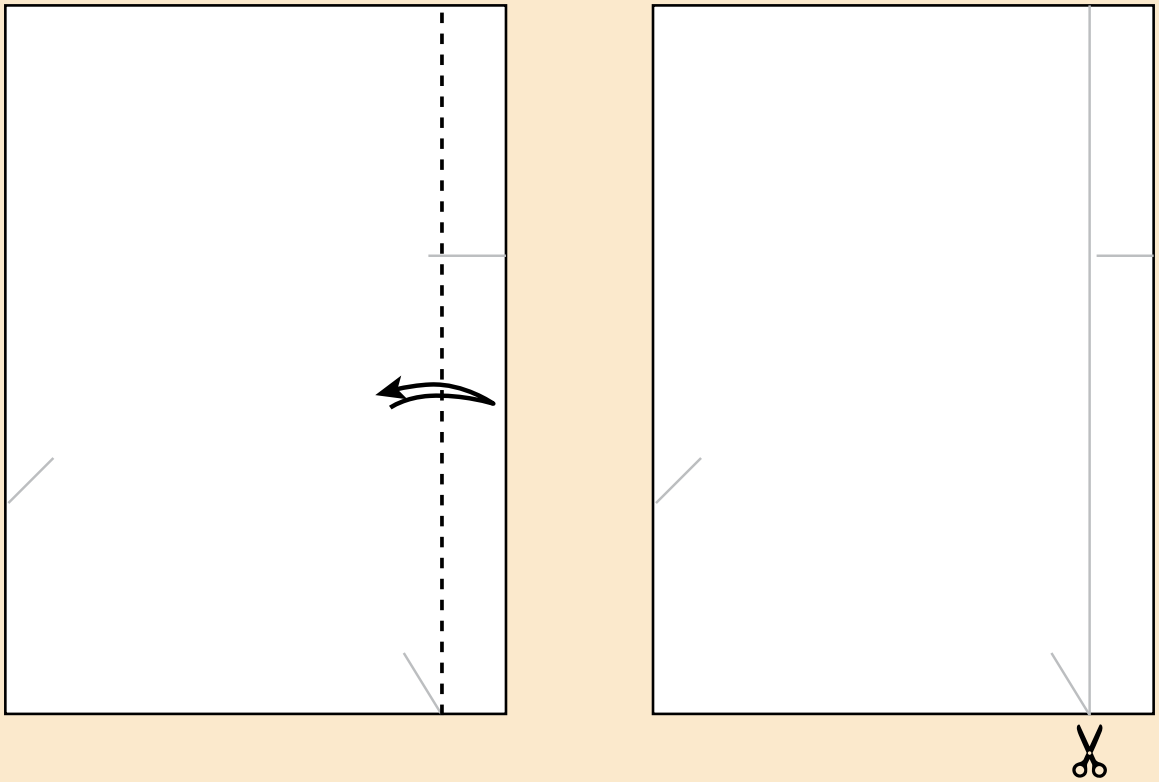
Golden Rectangle from any Rectangle

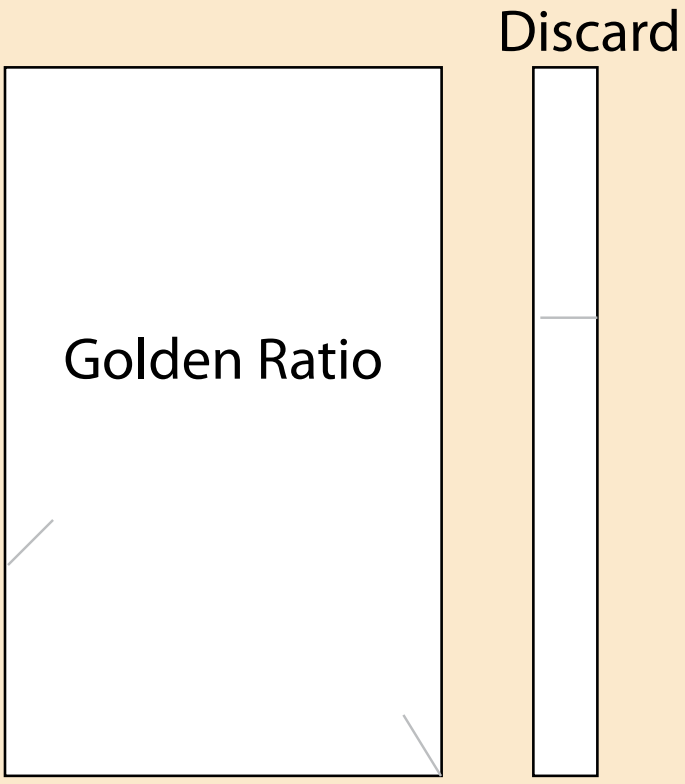




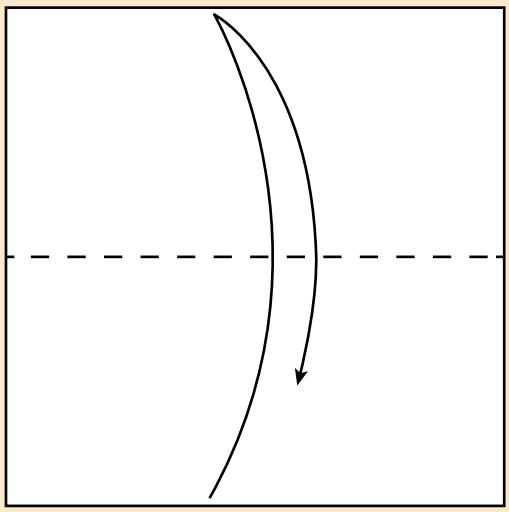


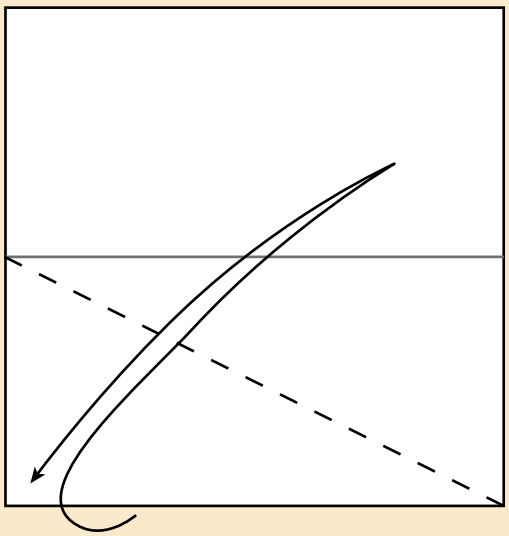


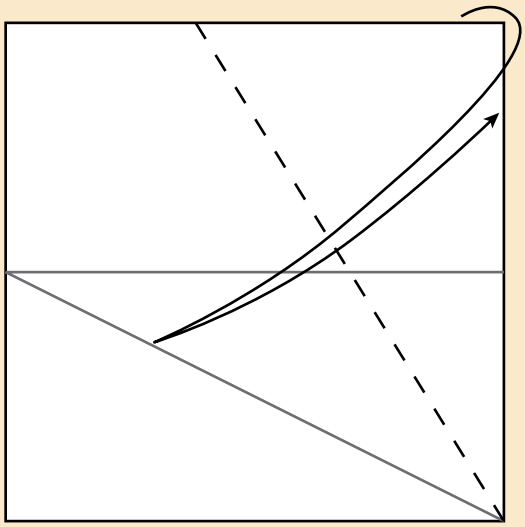


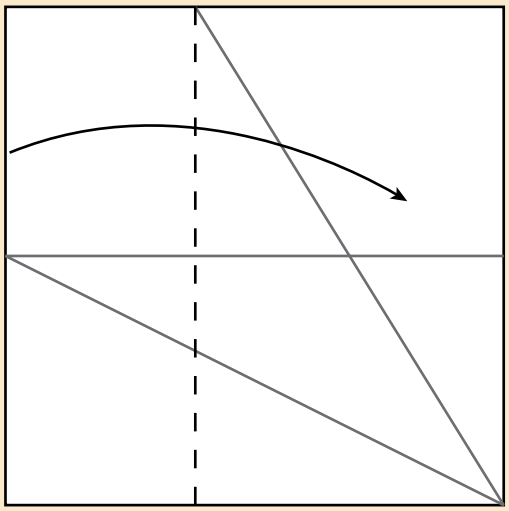

Discard
Golden Ratio

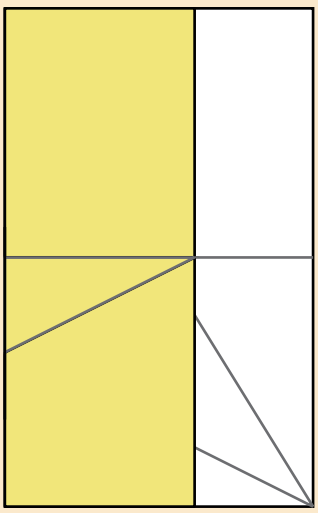
Creating 6 Golden Rectangles from a Square



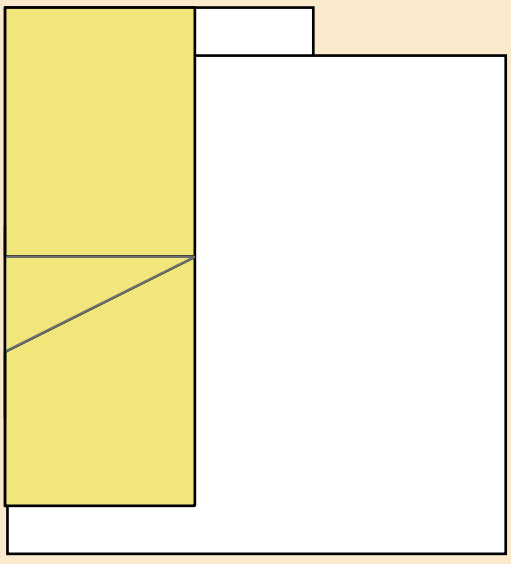




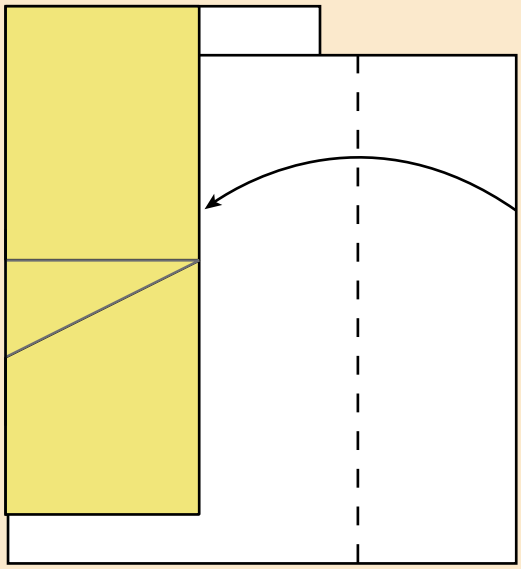


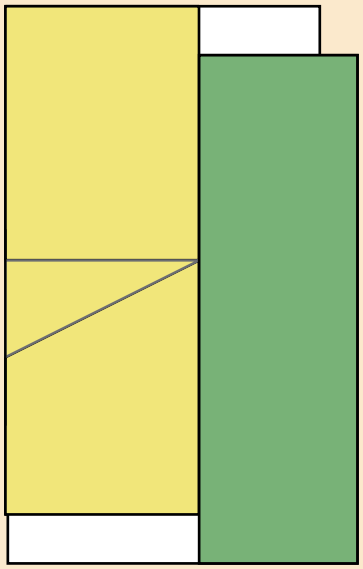


Template is ready

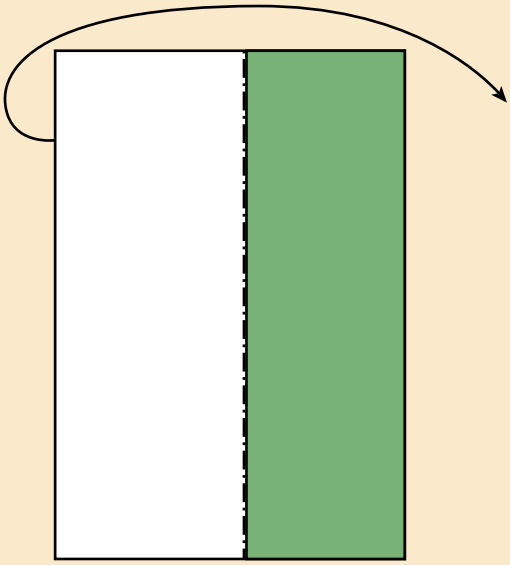


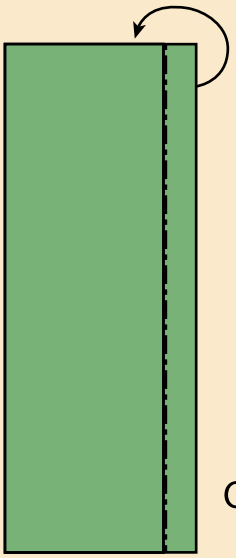
Place a second sheet into the template



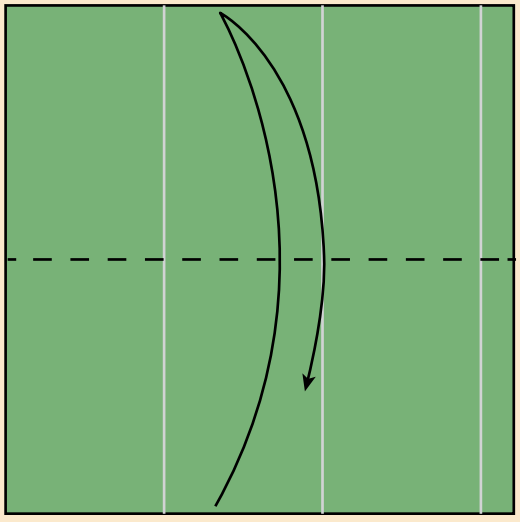


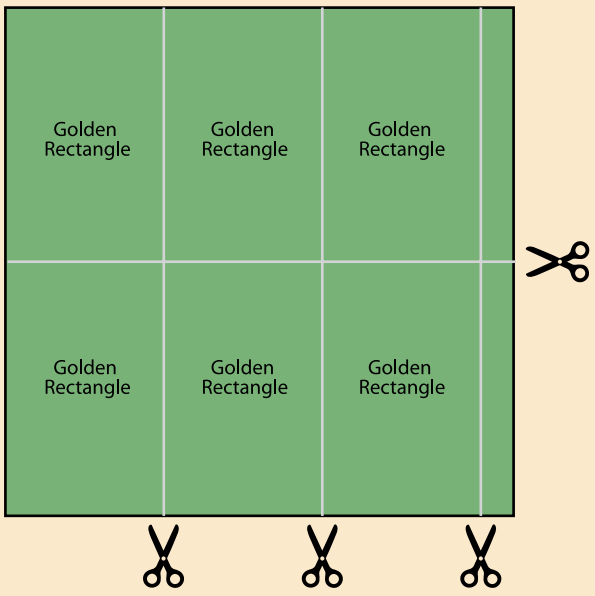
Take sheet out of the template





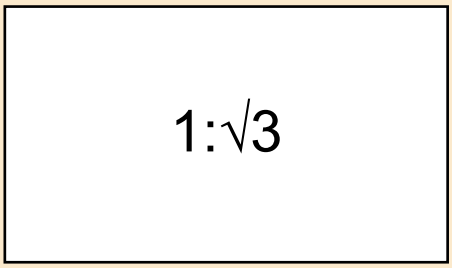
Open completly





Bronze Rectangle

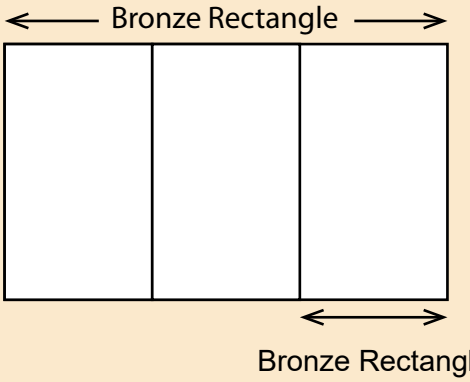
Bronze rectangles are often used in origami for making shapes with 30°, 60° or 120° angles. The ratio of the width to length of a bronze rectangle is 1:√3.



Bronze Rectangle

Special Property

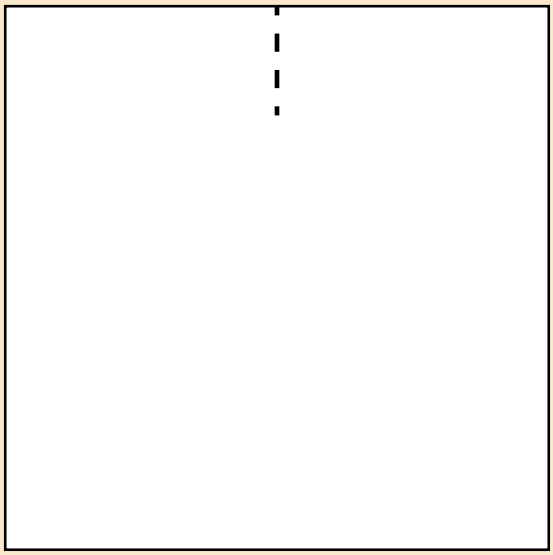
If you cut the bronze rectangle into thirds, the resulting pieces are also of the ratio 1:√3.

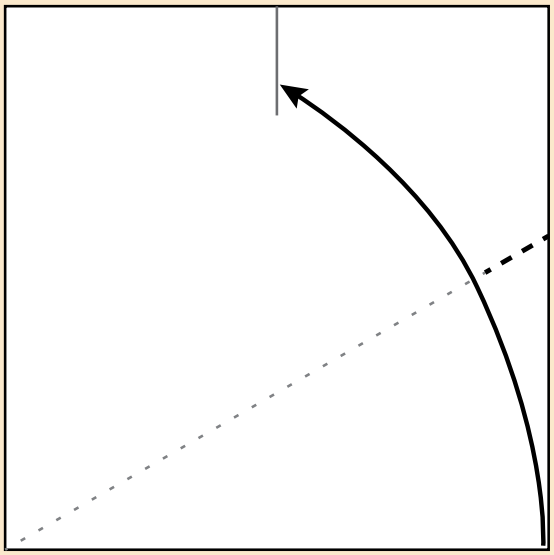


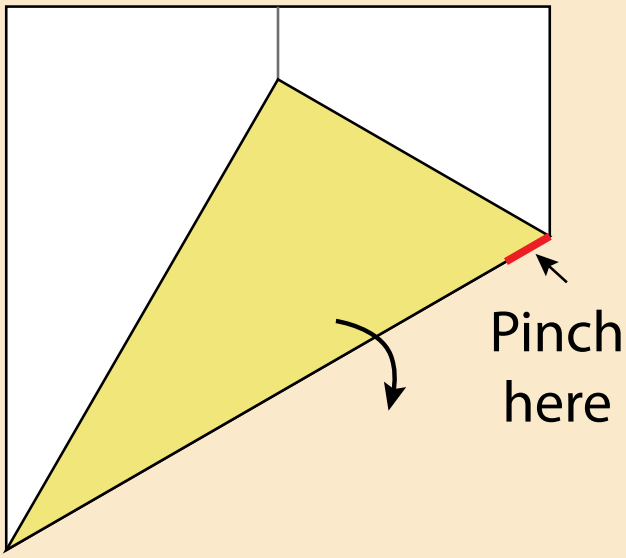
**Origami equilateral triangles, tetrahedra, and icosahedra often use the creases from a bronze rectangle.*

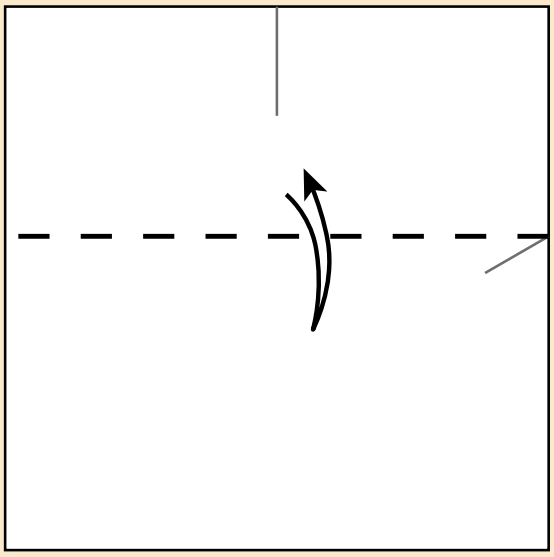
In the following chapter we will convert square and rectangle papers into bronze rectangles.

Bronze Rectangle from a Square

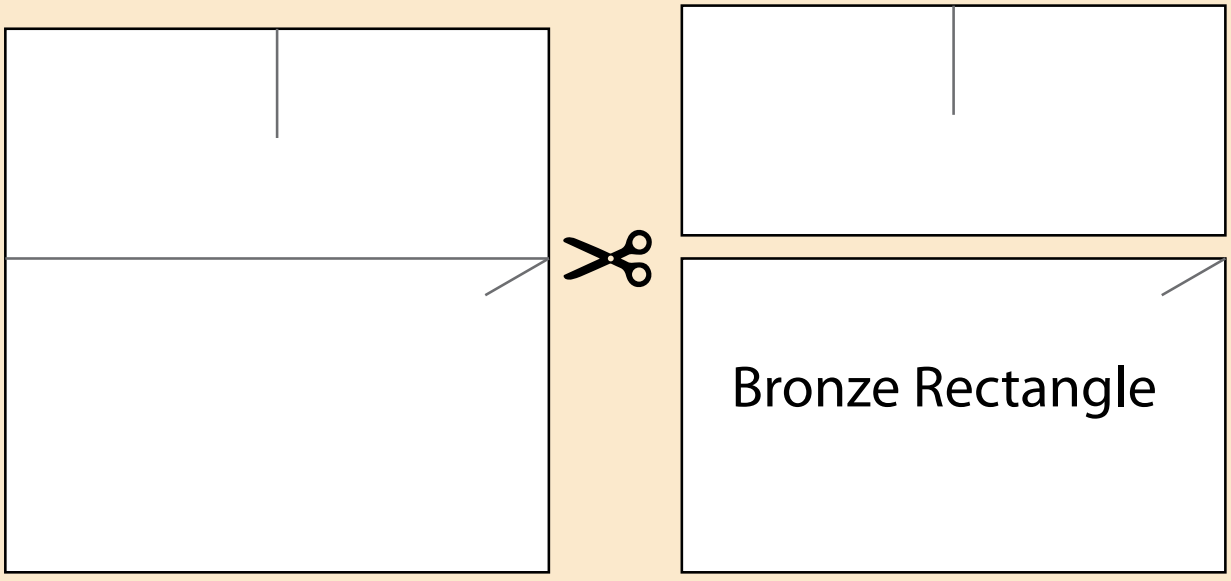




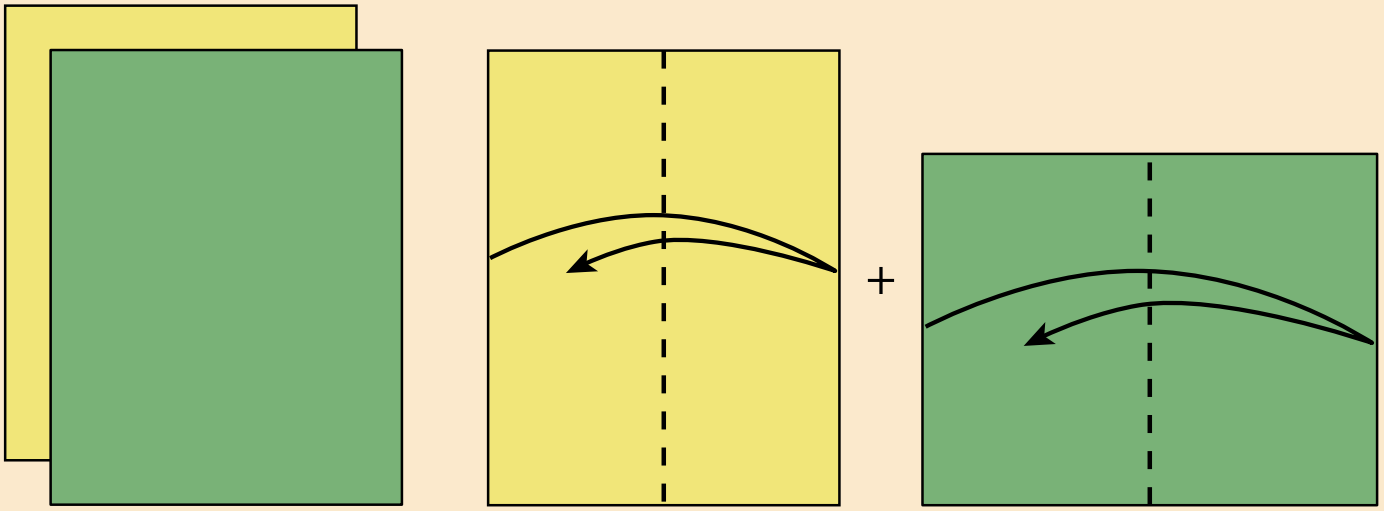


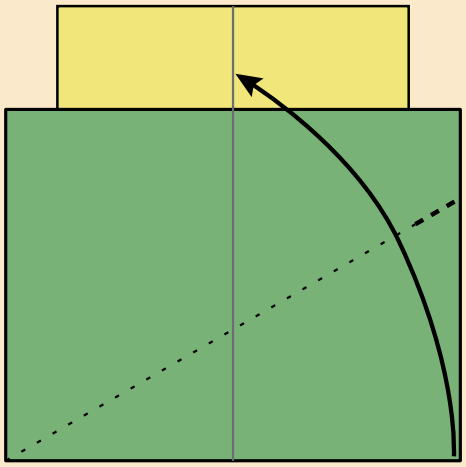


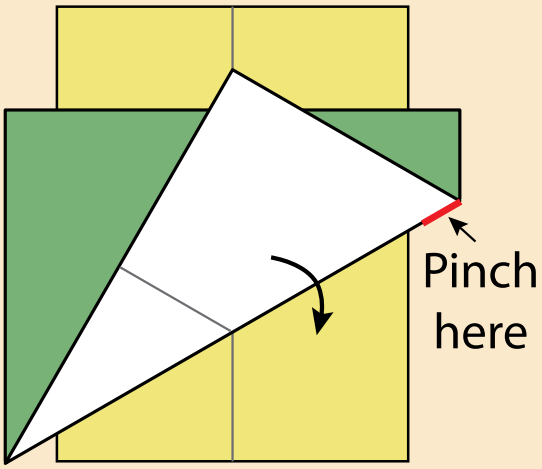
Discard

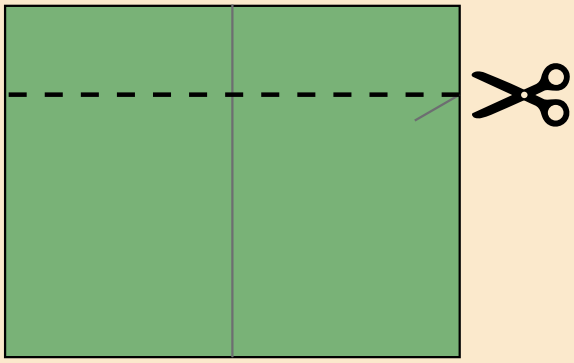


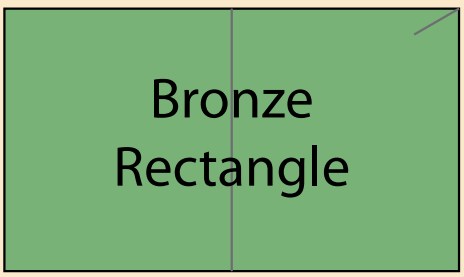
Bronze Rectangle from a Rectangle



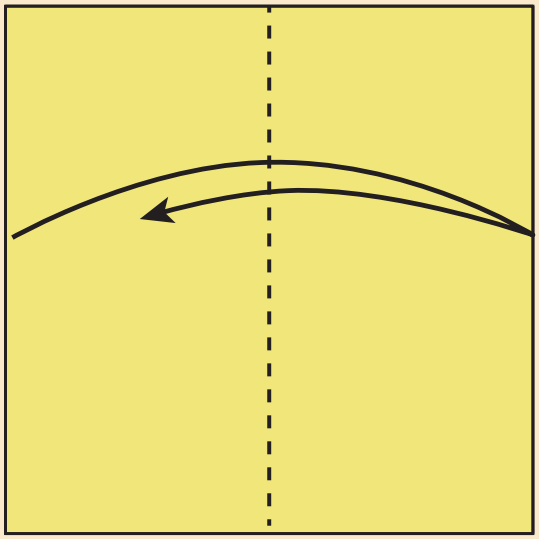


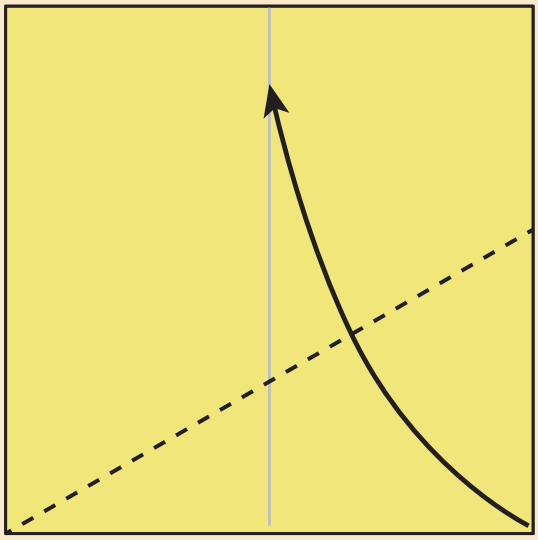


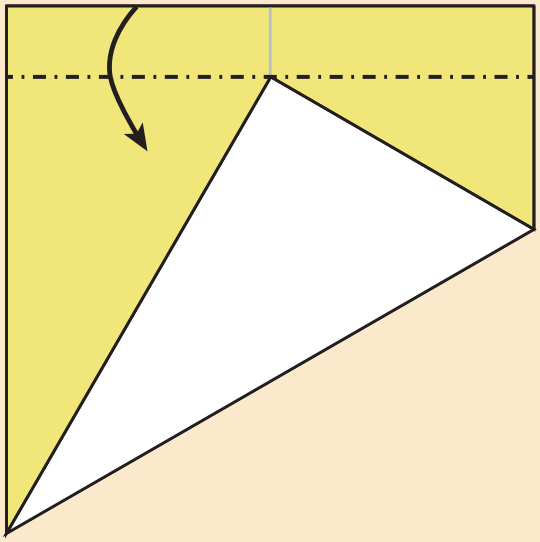


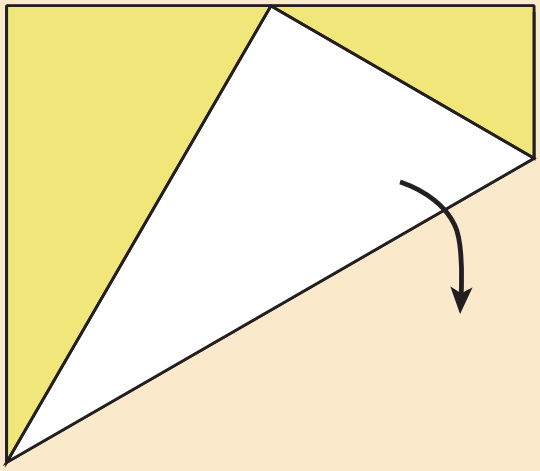


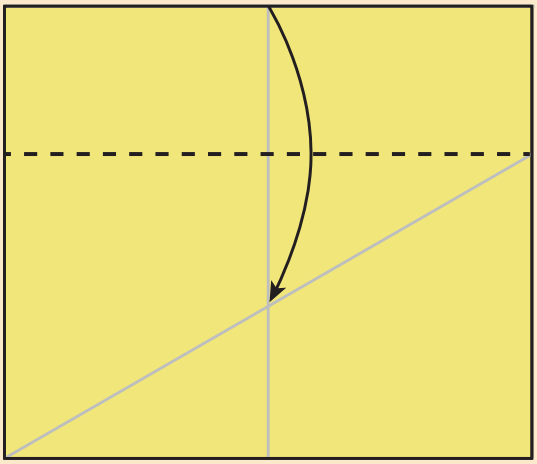
Creating 6 Bronze Rectangles from a Square

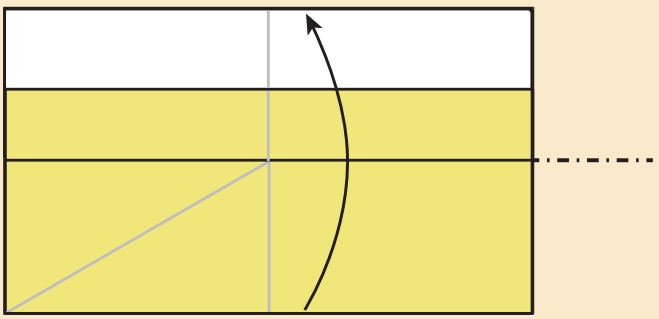


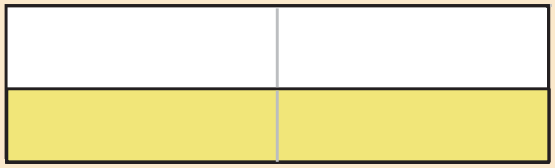




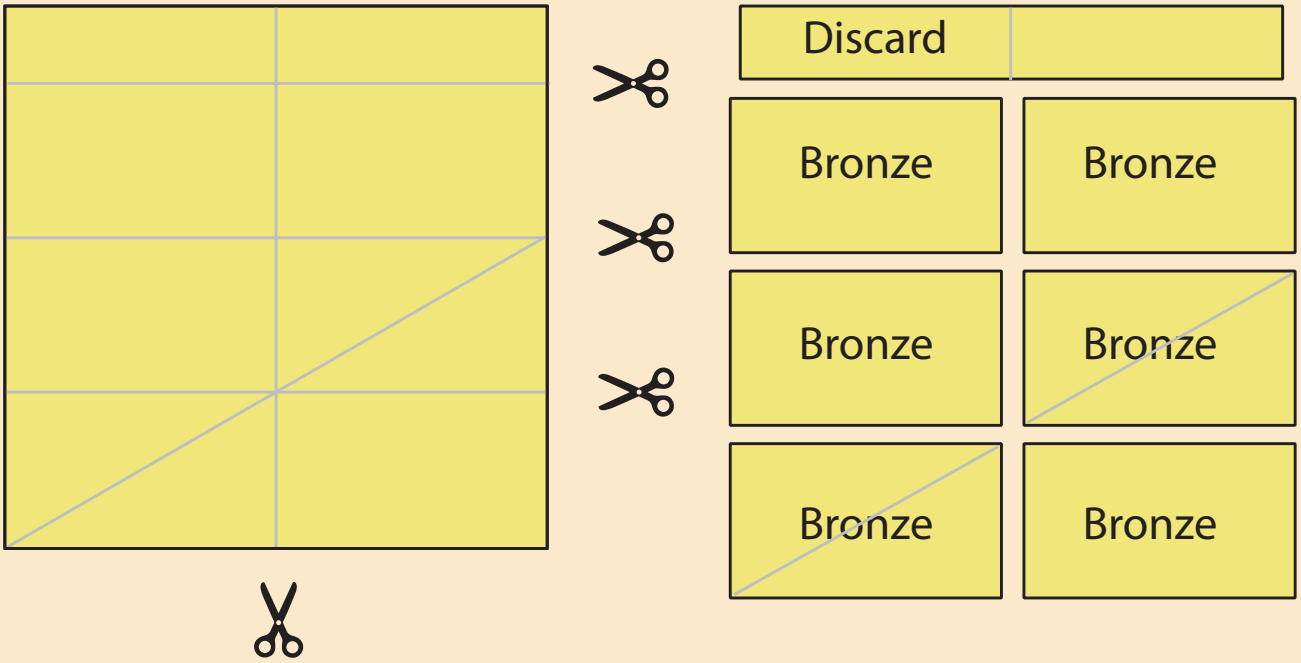








Open all

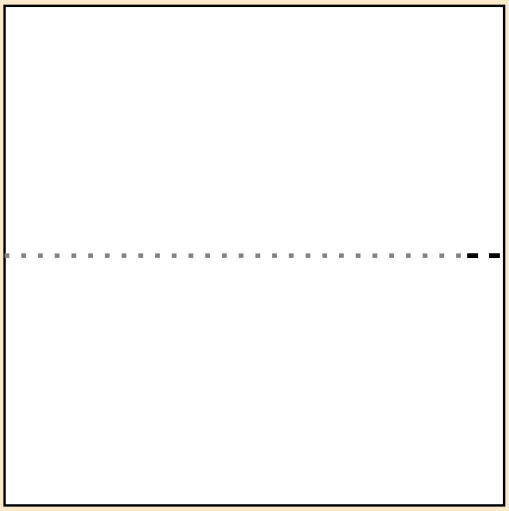


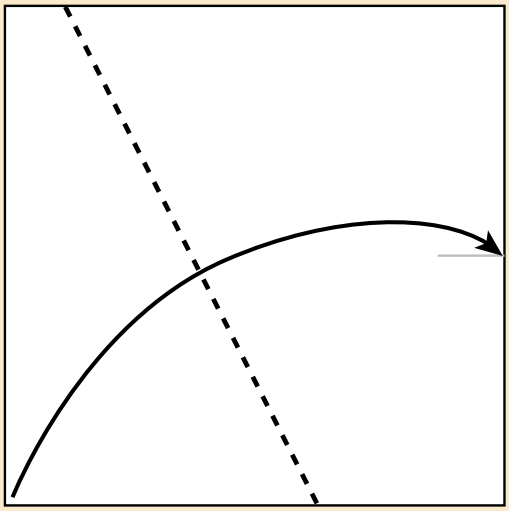
Paper Divisions

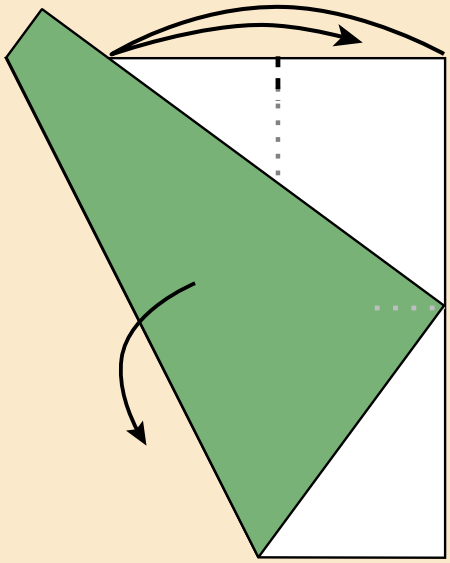
Sometimes in origami we need to divide our papers by an uneven number. Of course, we can always use a ruler, a sheet of second paper with lines or even the “s” method. The best and most accurate way will always be the origami-way.

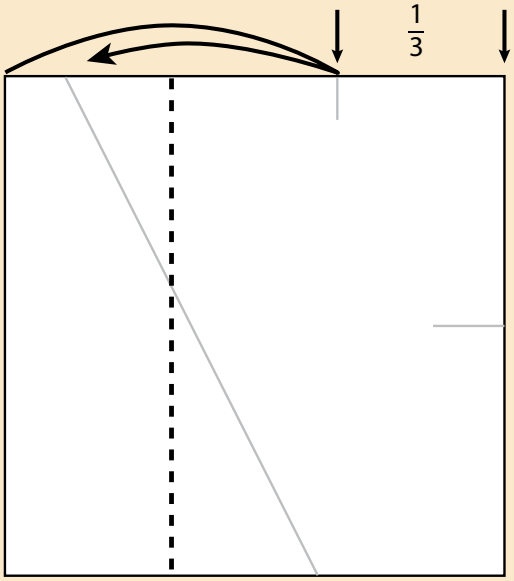
In the following chapter we will divide a square into thirds and fifths by using creases.

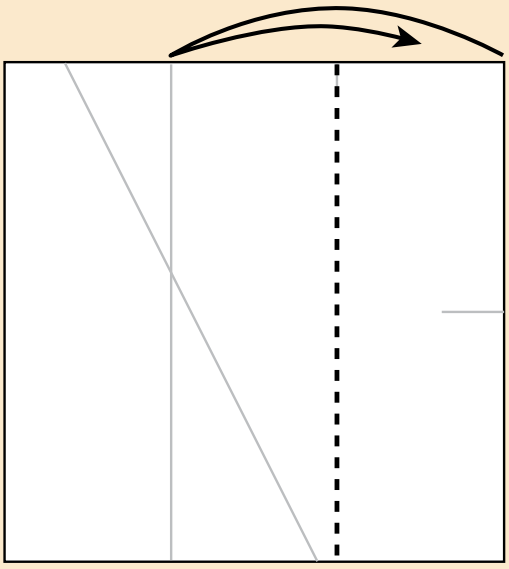
Divide a Square into Thirds

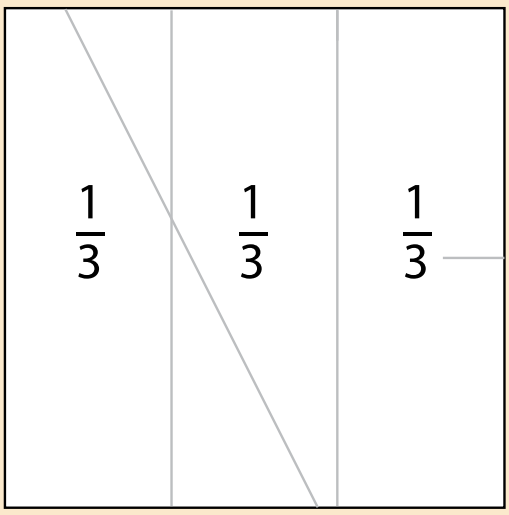




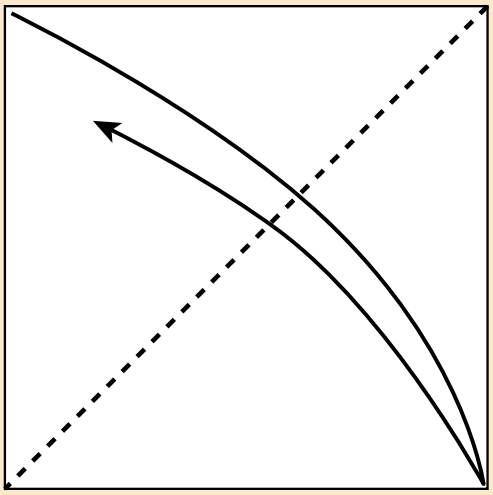


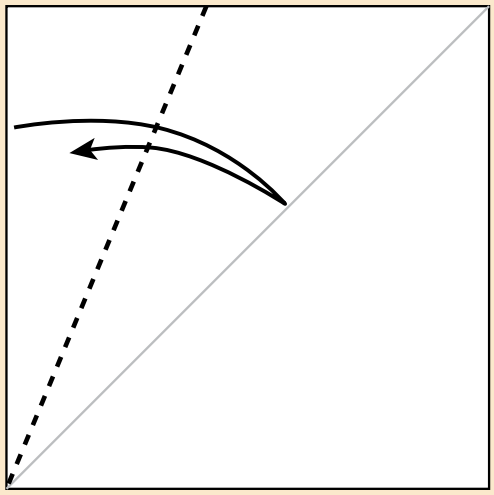


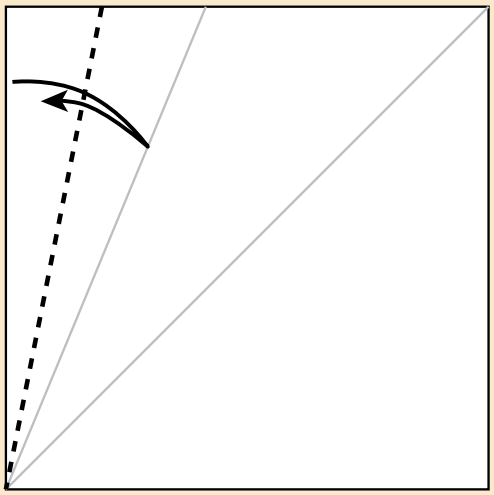


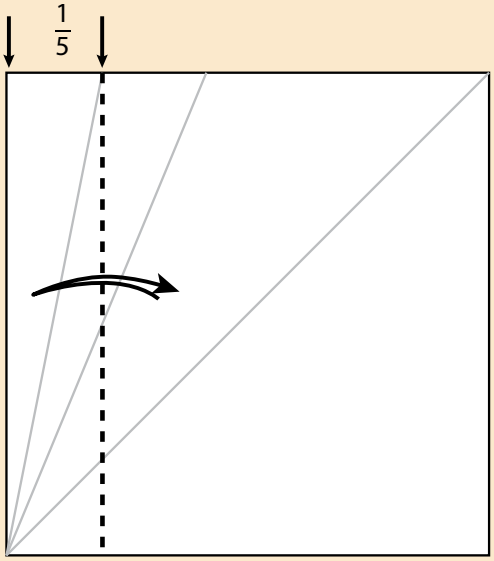


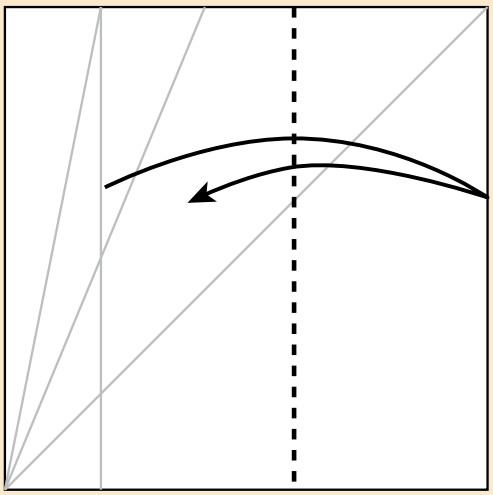
Divide a Square into Fifths

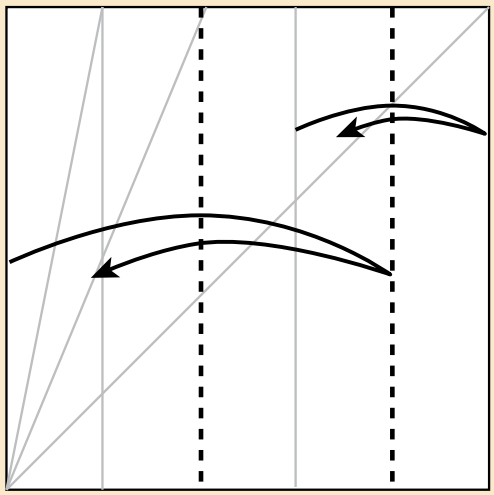










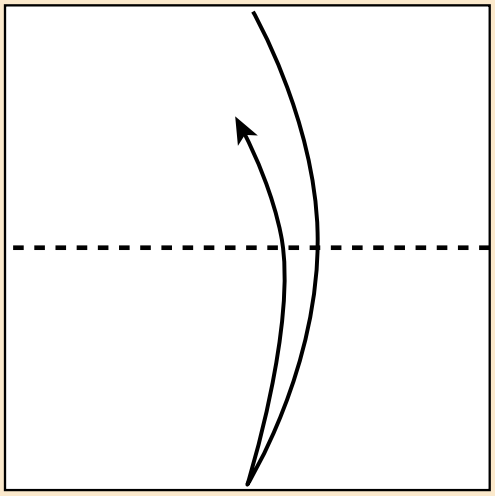


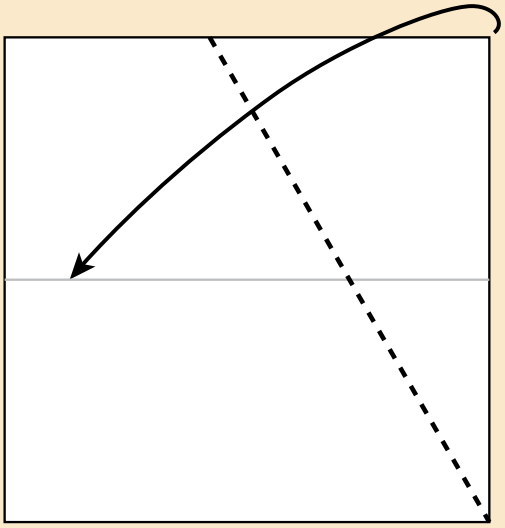
Paper Shapes

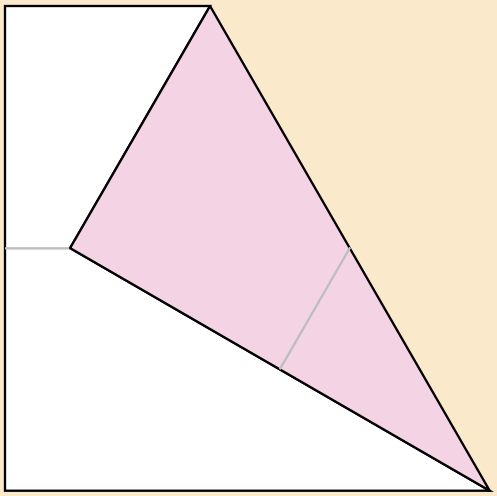
Sometimes in origami we need to cut various geometric shapes. Using origami methods always leaves creases on the final shapes.The best way to get a clean, uncreased, paper is by making a template.
If possible, purchase metal templates, these will give you the best and most accurate results.

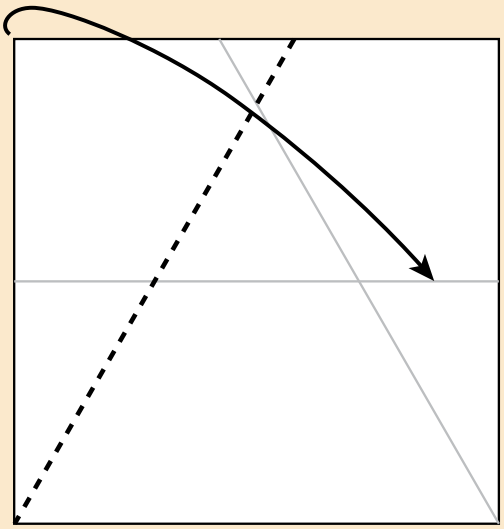
In the following chapter we will cut the “most used shapes” in origami from square and rectangle papers.

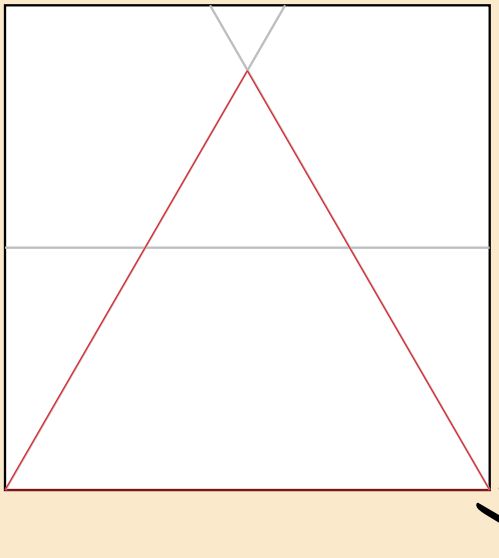
Equilateral Triangle from a Square

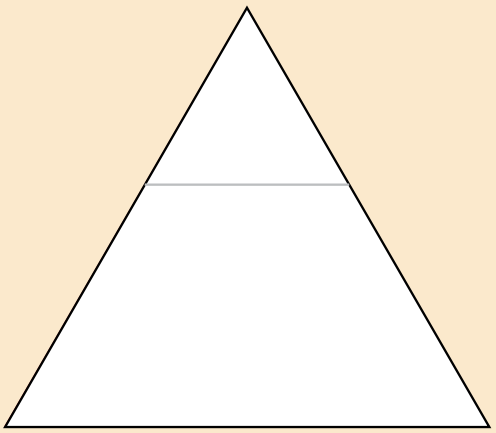




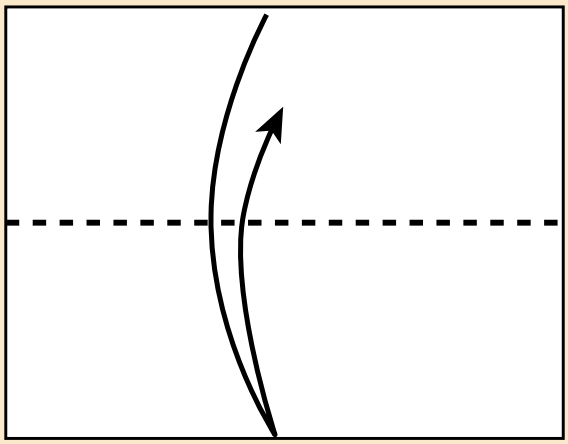


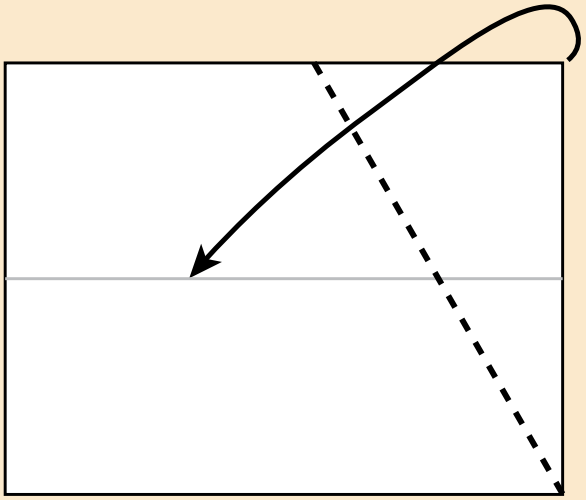


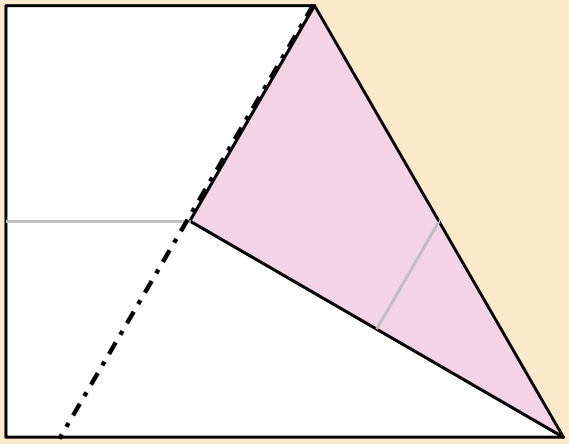


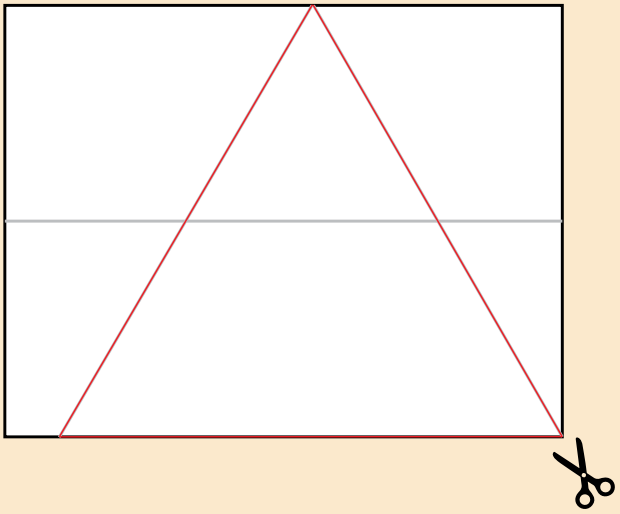


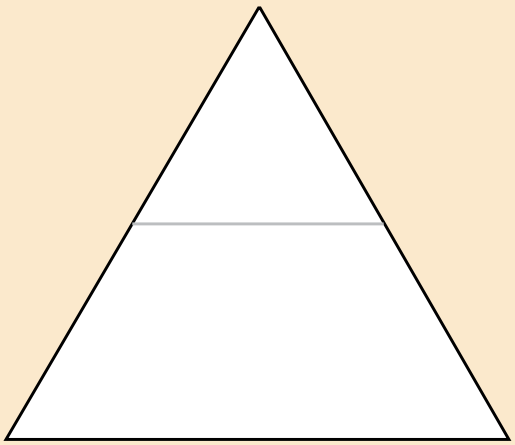
Equilateral Triangle from a Rectangle



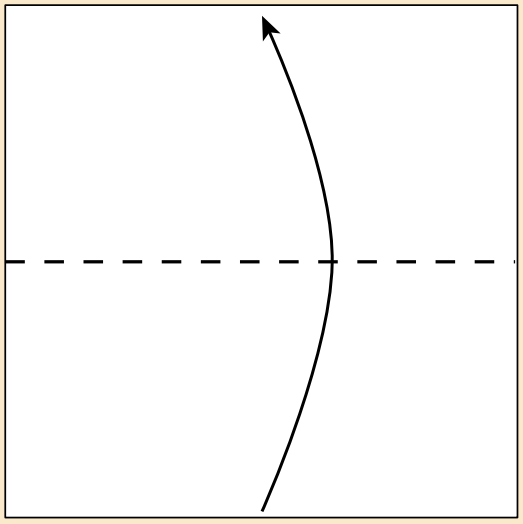


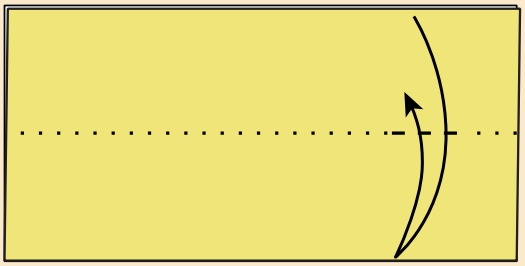




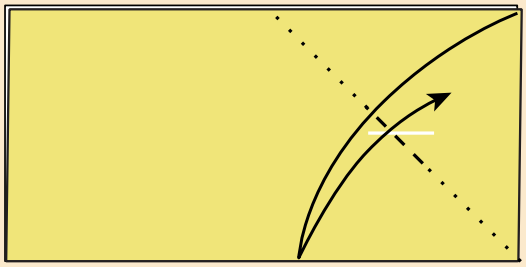


Pentagon from a Square

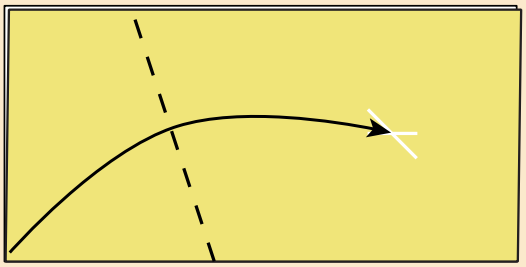




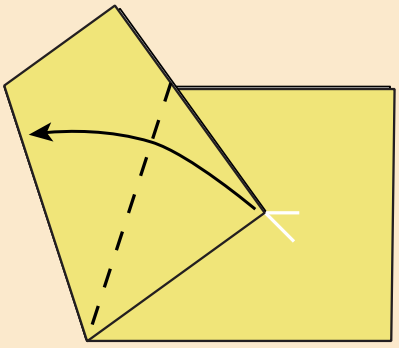
Pinch (top leyer)
only where indicated

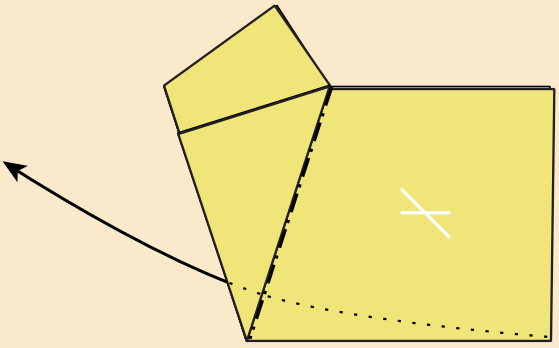


Pinch (top leyer)
only where indicated

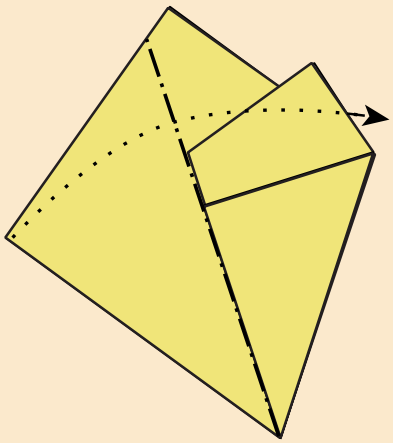


Bring the corner
to the pinchs intersection

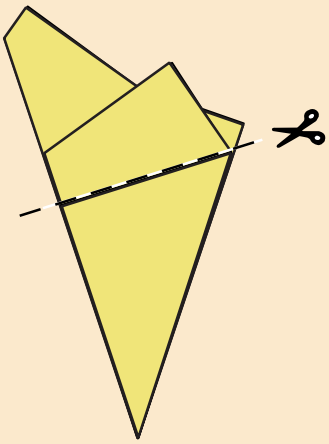




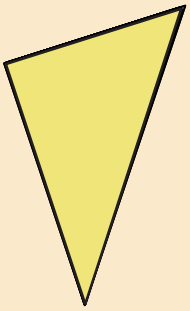
Mountain fold along the edge



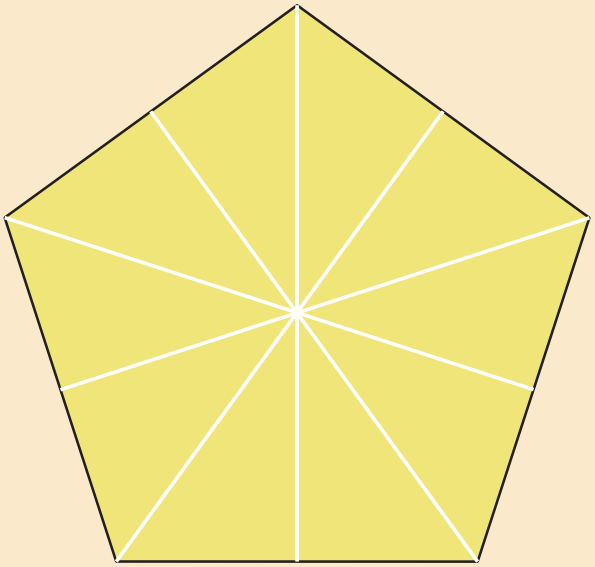
Mountain fold along the edge



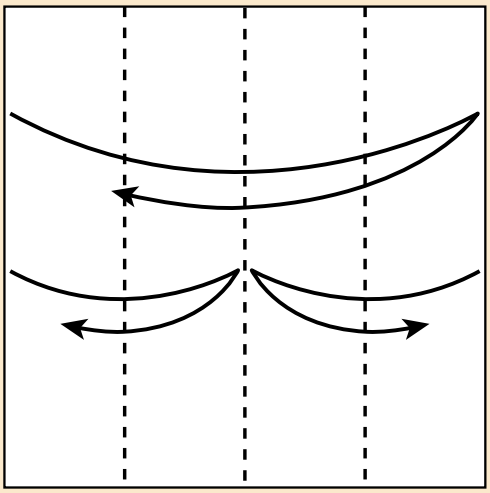
Cut along the edge

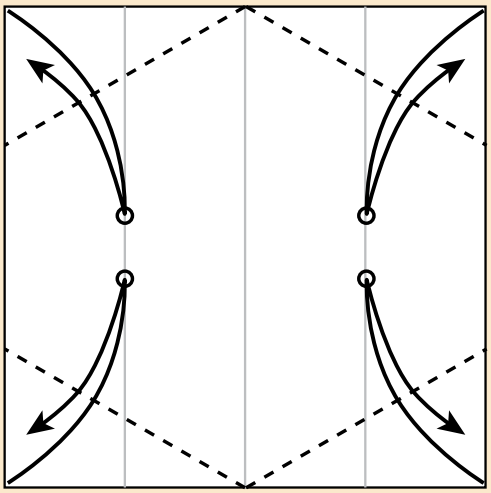


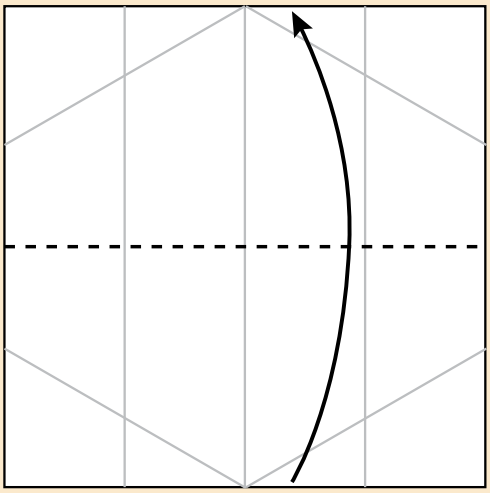
Open everything

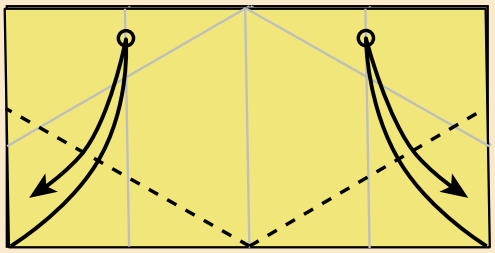


Hexagon from a Square

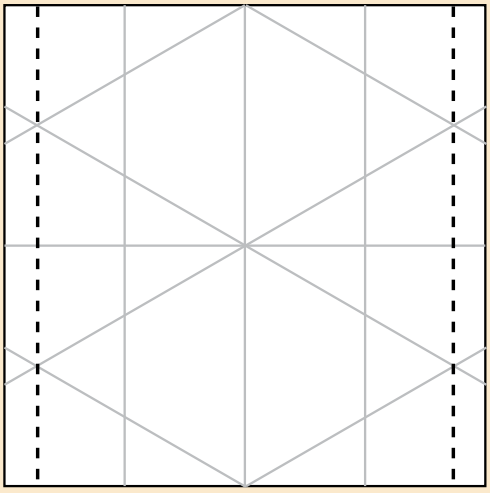


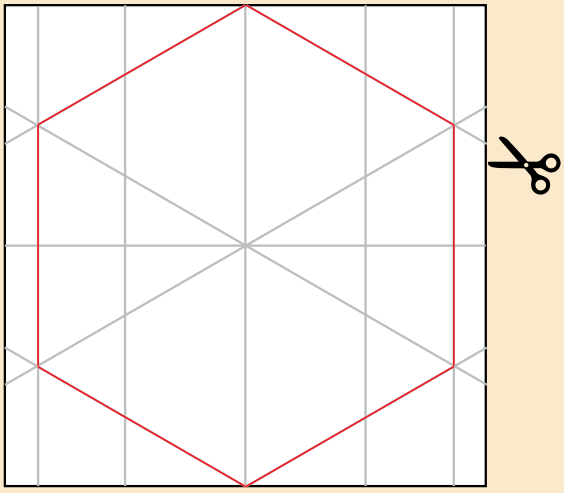




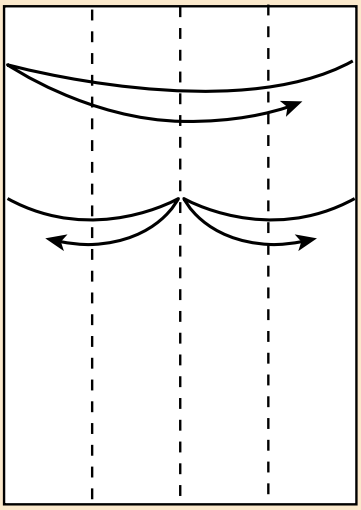


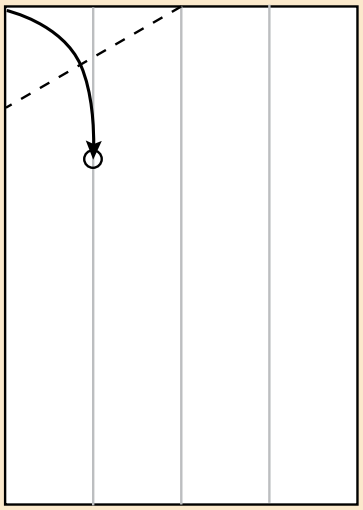
Fold the corners as shown.
Unfold everything

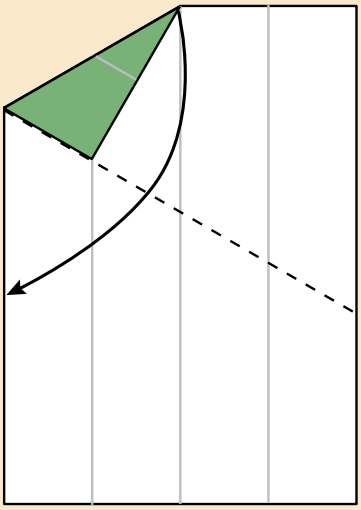


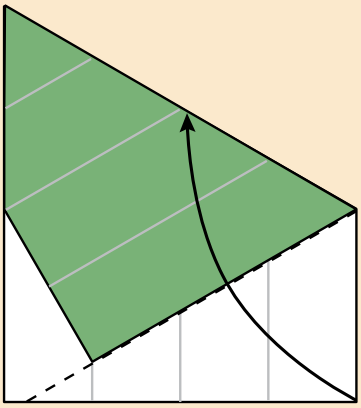


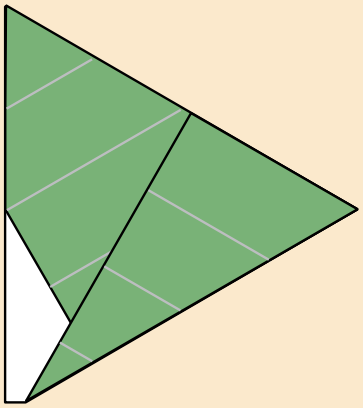
Hexagon from a Rectangle

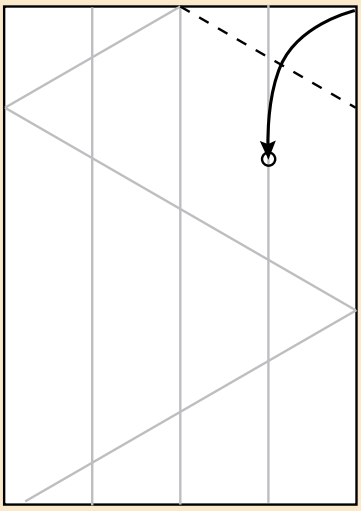












Repeat steps 2-5 starting from the right corner