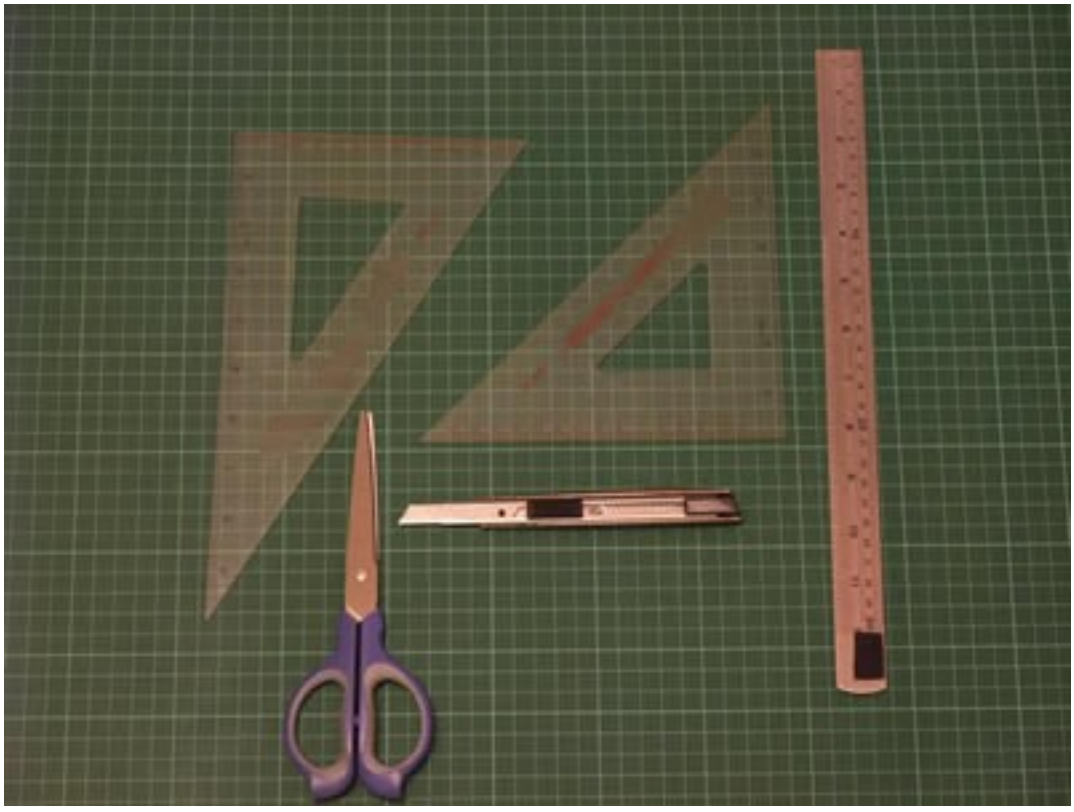
How to cut a true regular square of variable size in a minute.

A true regular square is a very important start for getting a good result in origami. Though we have those ready-made square papers dedicated for origami , they are indeed too small and only suitable for simple origami only. In addition , many of them , strictly speaking , are not true regular squares. In most cases, we have to cut the squares from large paper by ourselves. So an efficient and reliable way of cutting a true square would be of great help to get a good start and a satisfactory end product. The following method of cutting true squares was devised by me many years ago and has still been being employed since then.

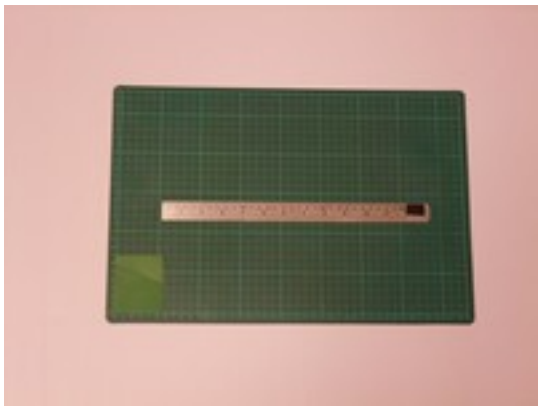
A) Tools



1/ Cutting mat

If you are always in need of large squares for doing complex origami , I'd recommend the size 58cm x 43cm. Otherwise a 43cmx28cm mat would be sufficient for cutting squares with the side's length less than 30cm.

(58cm x 23cm)



(43cm x 28cm)

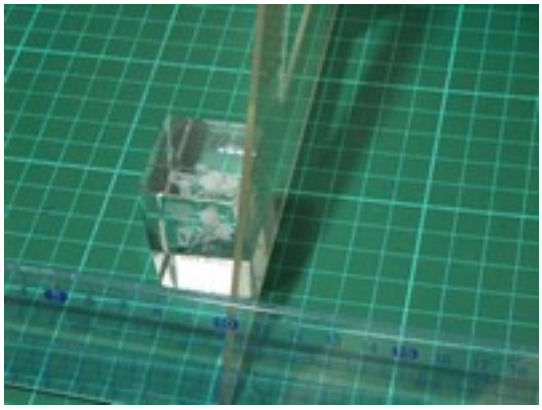
2/ Cutter

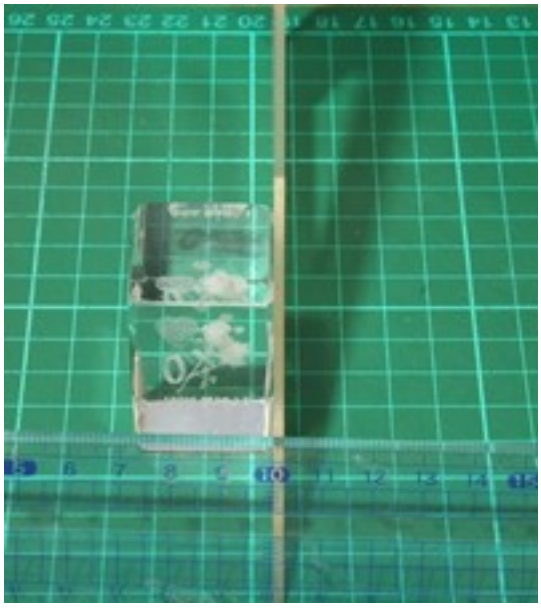
An ordinary size cutter will do, better with an anti-sliding lock. Being too light or purely made from plastics should best be avoided

3/ A set of 45° & 30° / 60° set squares

There are some special criteria for these set squares. First, they have to be at least 2mm in thickness. Second , the contact sides must be straight-edged. (see the photos) Those with slanted edges and curved edges are not suitable. In the present case , only the 45° set square is really needed. But the 30° / 60° set square is also used as an aid. The most suitable size of the 45°set square is 18 cm in length on the side adjacent to the right angle.

As accuracy is of paramount importance , only high quality ones are recommended.





4/ Steel Ruler

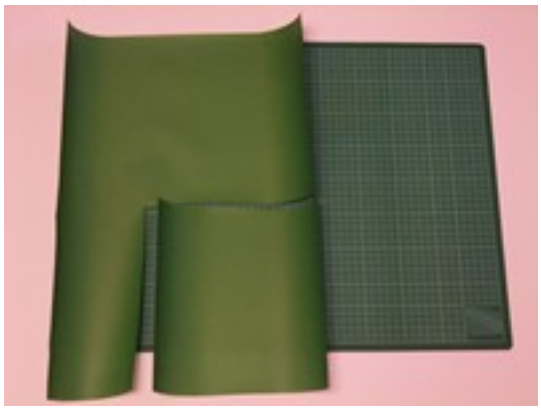
The most suitable size is 30 cm in length. In cutting squares with side length greater than the steel ruler's , we have special means to overcome this problem. Though a longer one will also do , its heavy weight would be a hindrance in handling. So it's not recommended.

5/ A pair of scissors

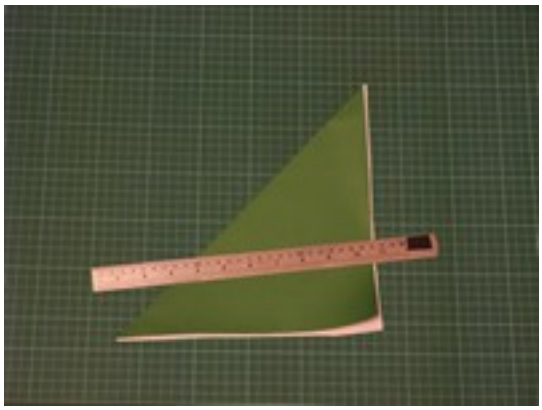
B) Procedures

1/ Normally , we only have an approximate size in mind and seldom need a square with exact length. Those large-sized papers usually come in rectangular in shape. First we cut a rough square from the large paper with a size slightly greater than the desired size in mind.

Fold along the diagonal of the rough square and crease firmly. Position the triangle so formed in the way as shown in the photo.



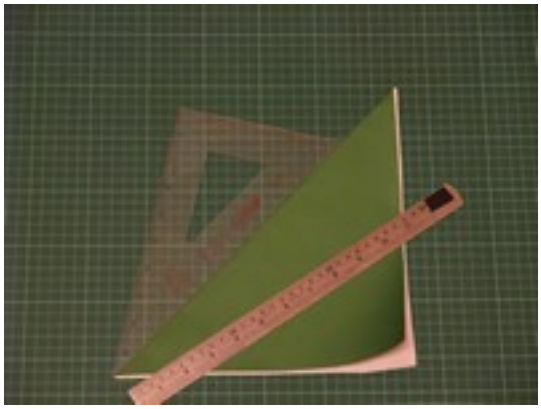
a)



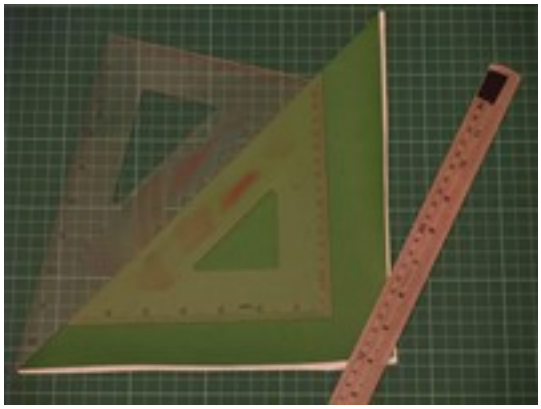
b)

2/ Place the 30˚ / 60 ˚set square with its slanted side (hypotenuse) in close contact with the slanted edge of the paper. The 60˚ angle should be at the top with a distance of about 6cm from the right top corner of the paper.

Note : The 30˚ / 60 ˚set square can be replaced by a straight ruler with the same features.

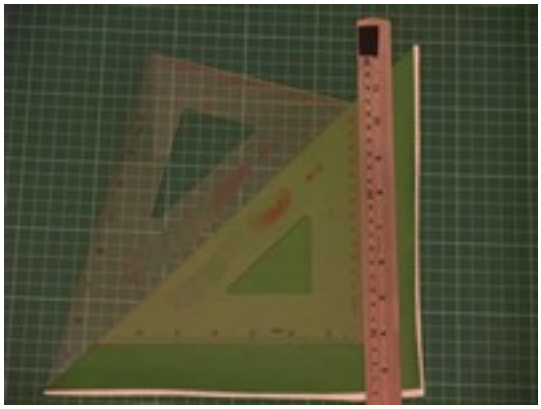


3/ Place the 45˚ set square with its slanted edge in close contact with the 30˚ / 60 ˚set square's. Be sure the right top corner of the 45˚ set square is slightly (about 1cm) beyond the 60 ˚ corner.



4/ Place the steel ruler in close contact with the right vertical edge of the 45˚ set square. Move the 45˚ set square together with the steel ruler towards the right edge of the paper by sliding it along the slanted edge of the 30˚ / 60 ˚set square. You should stop at the place just a little bit before the imaginary line where the upper layer of the paper overlaps the

lower layer completely throughout. If you want a smaller square , just stop at a longer distance from the edge of the paper.

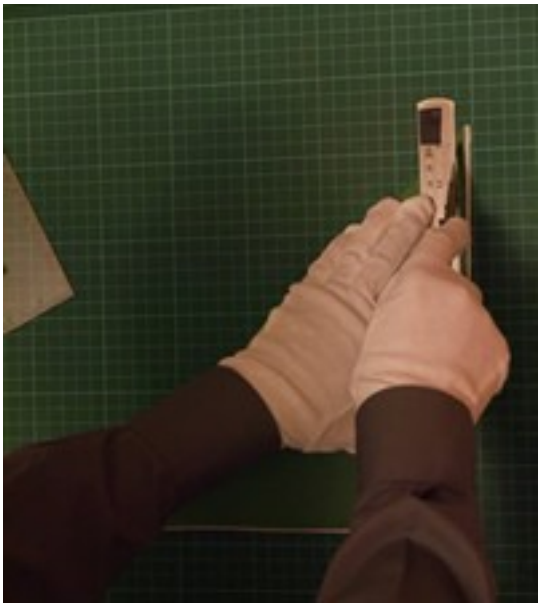


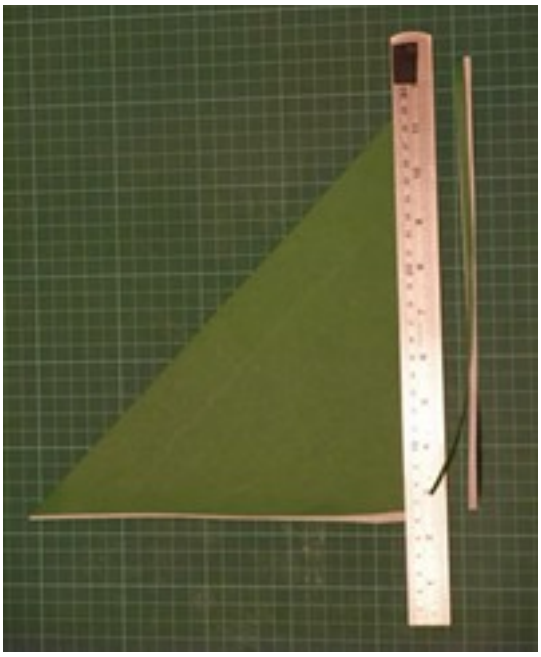
5/ In order to bring the ruler and set squares in true seamless close contact , some practices might be needed to obtain greater accuracy. Hold the set squares with your left hand as shown in the photo. The middle finger and the thumb of the left hand should push towards each other while the right hand pressing on the steel ruler should push towards the vertical edge of the 45° set square.

6/ Now press firmly on the steel ruler with your right hand , and remove your left hand together with the set squares. With the index finger and middle finger of your left hand pressing together , place them on the steel ruler just about 5cm below the top corner of the paper. (This should also be the position just above the middle finger of your right hand.) At the same time , place the ring finger and the thumb on the border line between the steel ruler and the paper. This will help to counterbalance the inward push created during the process of cutting.

a) b)

7/ Before placing the set squares and steel ruler together , make sure the cutter is in a nearby position where your right hand can reach. Now press the fingers of your left hand firmly on the steel ruler and remove your right hand to reach the cutter. Then start cutting the paper along the free edge of the steel ruler. After cutting off the paper on the right side of the steel ruler , you'll get a true 45˚angle on the paper.



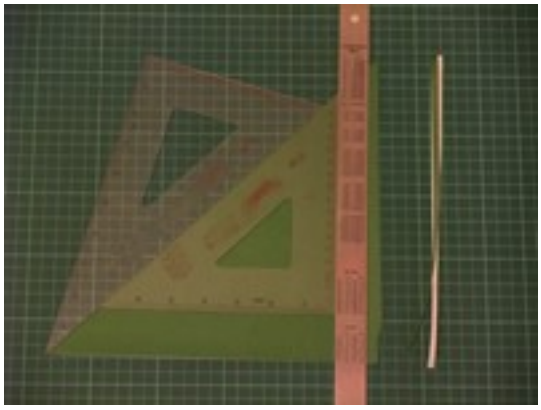


a) b)

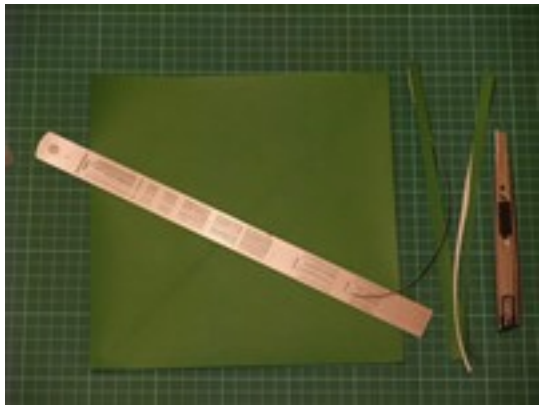
Note **:** If the side length of the square to be cut is close to the length of the steel ruler's , displacement of the ruler may take place when the cutter blade approaches the lower end portion of the ruler. This will usually be the case when thick paper or foil-backed paper is being cut. In this case , we can make a remedy by synchronizing the left hand fingers with the movement of the cutter. When the cutter blade has advanced to the neighbourhood of the thumb of your left hand , just pause the cutting for a while. Lift the fingers on the upper part onto a position just above the

thumb , press firmly , and then move your thumb to the lower portion of the ruler. Afterwards , you can resume the cutting to the end.

8/ Then turn the uncut side of the paper into the same position as the start , and repeat the previous procedures. Finally a 45° isosceles triangle is formed with two layers of paper overlapping each other. When opened , a true regular square is obtained.



a)



b)

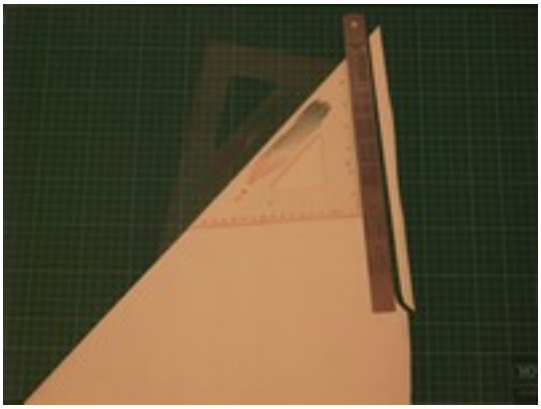
Attention **:** Children should not perform the above activity alone unless guided by an adult or granted the permission to do so. Best of all, this should be performed by an adult or person competent to carry out the task.

Supplement

How to cut a square with its side length greater than the steel ruler's.

Procedures :

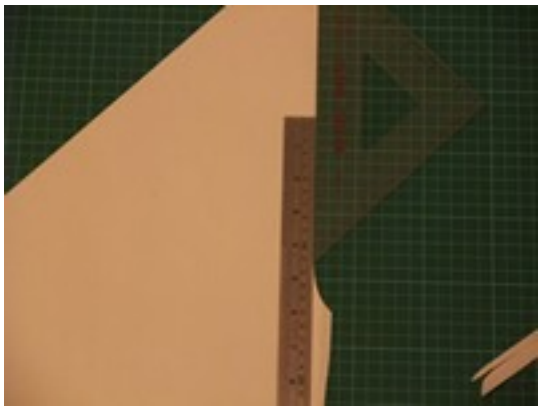
1/ The basic procedures are the same as previously described. This time when the cutter blade reaches approximately 1 cm above the end point of the ruler , curve it out to cut off the paper.

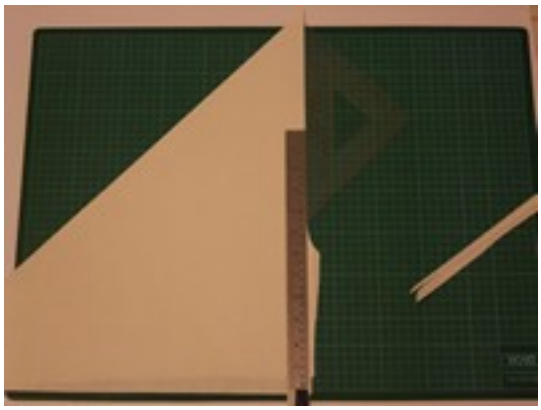


2/ Then move away everything. Place the slanted edge of the 45° set square in close contact

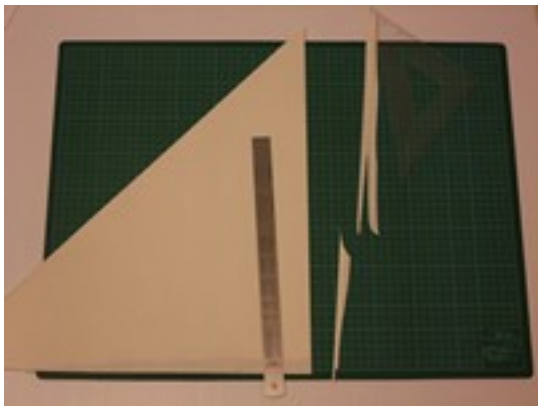
with the previously cut edge of the paper. The lower corner of the set square should be just slightly above the curve. Stabilise the set square with your right hand.

Then press the steel ruler against the slanted edge of the set square with at least 10cm in contact with each other as shown in the photo. The larger the contact area , the more accurate it will be.





3/ Stabilise the steel ruler with your left hand , then remove your right hand together with the set square. Start cutting from 1cm above the curve and continue until the end is reached. If one additional cut is not sufficient , repeat the above procedure until it's done.



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Gabriel Vong' s Ori-Scope

By Gabriel Vong 2009