



The Golden Rectangle

Photo courtesy of Rob Brown, Equinox Interiors.

The golden rectangle, or in its three-dimensional counterpart, the golden solid, can make the difference between a design that is pleasing to the eye, and one that seems awkward and clumsy. Even the most innovative design can seem unbalanced, if its parts are out of proportion.

The golden rectangle is a proportion (or ratio) found in nature, in the solar system, and even in your own body. It is believed that when this natural proportion is designed into a piece of art (or woodworking project), that the resulting design is perceived as balanced or pleasing.

What makes this proportion so pleasing? Without being overly technical, it's the equation $[1+\sqrt{5}]/2 = \phi$ that makes it work. The Greek letter Phi (ϕ) represents the golden ratio or the golden mean, which can be expressed as the value 1.618.

In a golden rectangle, the longer dimension will be 1.618 times the length of the shorter dimension. If you happen to add the lengths of the two sides together, you would also find that the golden ratio applies to the sum of the two sides relative to the longer of the two original dimensions. This is a naturally occurring proportion that repeats itself easily.

In nature, this proportion can be found everywhere, from the human body (where the eyes are set in the head) to the spacing of the planets from the sun. The same ratio

can be found in the lengths of the bones in your hand and in the construction of the pyramids of Egypt. This ratio has proven to be so pleasing to the eye that it has ended up in many artists and woodworkers' masterpieces.

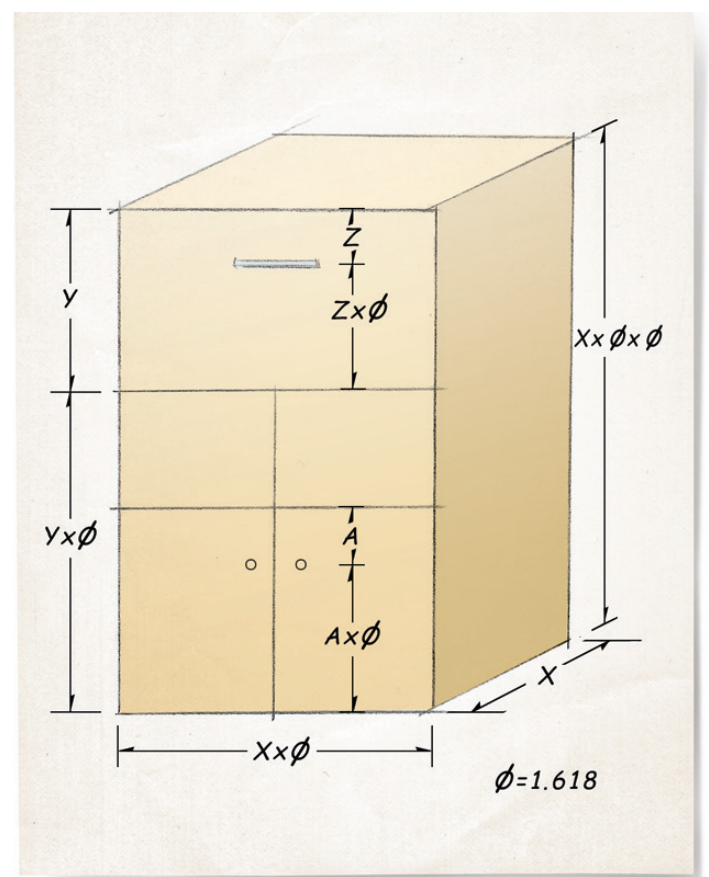
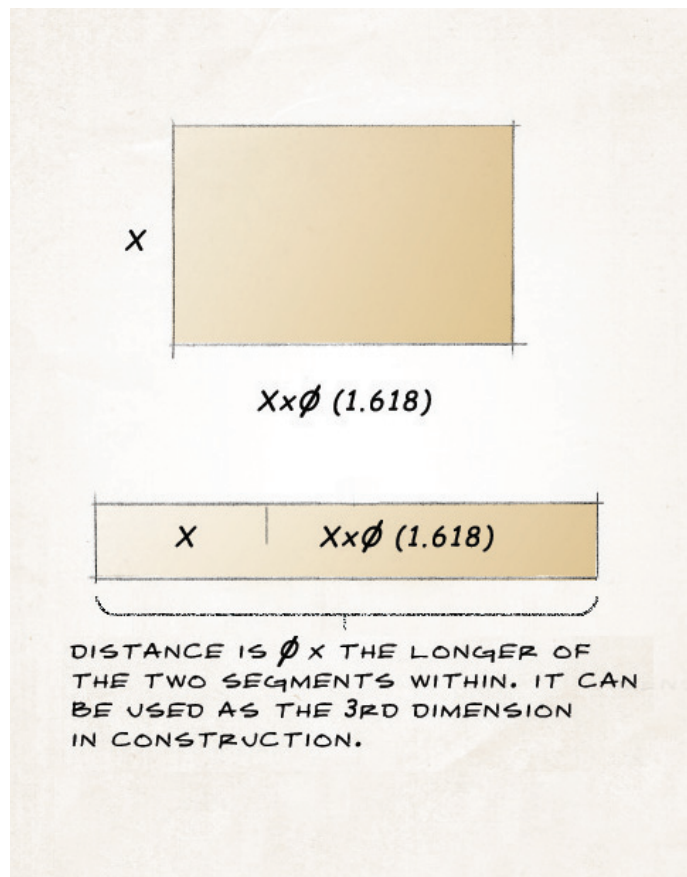
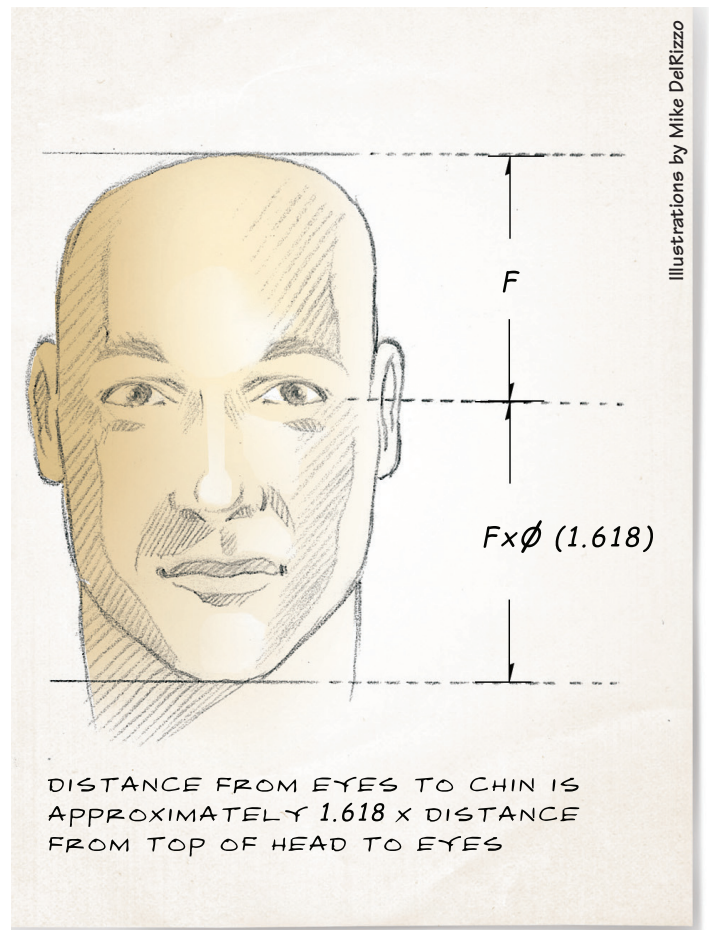
The golden ratio can be used as a guide when sizing various project parts during the design stage. It can be the size of the carcass itself or the drawers and doors in it. Even smaller details such as the placement of drawer and door hardware can be guided by the golden rectangle

The golden solid can be expressed as the three dimensional version of the golden rectangle, with the proportions extending to create a volume. Of course you must remember that function is still more important than form. Don't design a piece that is too big or too small in order to fulfill the requirements of a golden rectangle. Even if you are not exact on the dimensions, the human eye can still fill in the blanks and make mental adjustments for slight variations on a theme.

Designing furniture does come with certain restrictions: a table must be a specific height, a certain number of shelves may be required for a bookcase, or a cabinet might have to be built to fit a limited area. The golden ratio may still be applicable in other aspects of a piece. There are elements such as table legs, drawers, and hardware that can all be figured in using the ratio. Also, don't forget that rails, stiles and other elements can be calculated using the golden ratio to determine their dimensions.

Graduated drawers can be designed using the golden ratio to get the perfect proportions. Starting with the narrowest drawer you can increase the size by multiplying the height of the drawer by Phi (1.618), and then multiplying the height of that drawer by Phi to get the height of the second drawer, and so on, until you have the number of drawers you need to fit your piece. You might have to vary the starting size a few times when you work out your calculations, in order to have a completed set of drawers that will work with your project. This method would also work when designing shelving, where the shelves would be designed with graduated spacing.

Perfect proportions are often impractical when designing for the real world. Almost everything that you design will have to fulfill a certain set of requirements before aesthetic considerations are taken into account. Even incorporating some of the principles of the



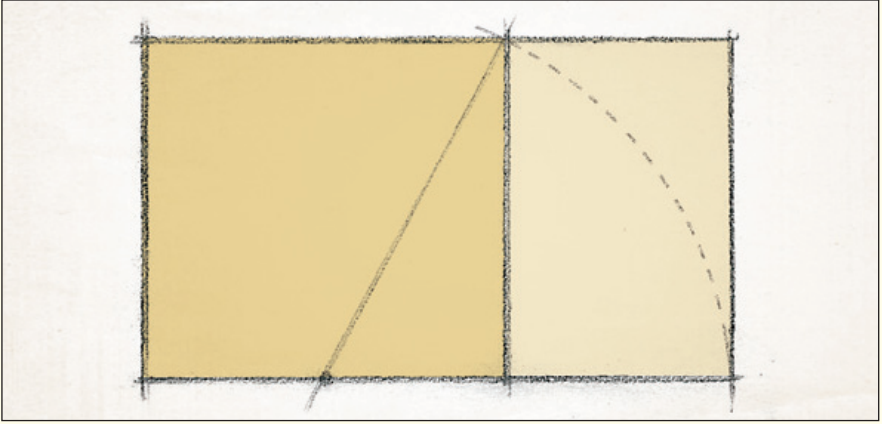
golden rectangle into your project will produce a much better result than totally ignoring this useful design tool. Many small adjustments, such as using mouldings to make something look larger, or changing the length of the legs slightly on a piece of furniture, can improve the proportions and resulting visual appeal. After exact mathematical measuring, it will still come down to using your eyes to determine if you need to make small changes in order to render your project more visually appealing.

If you are interested in finding out more about the golden rectangle, go to: www.en.wikipedia.com and search the words 'golden rectangle'.



MICHAEL KAMPEN
kampen@canadianwoodworking.com

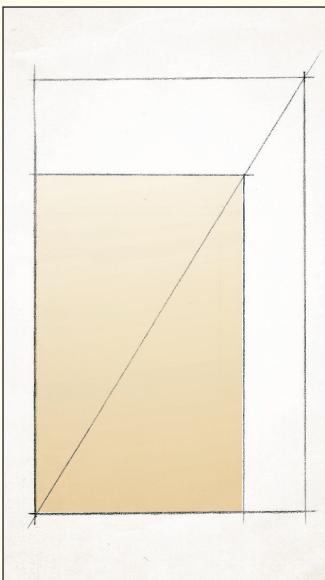
Drawing a Golden Rectangle



Method 1

Use this method where you know one dimension for a golden rectangle that you wish to create.

- Draw a square, and mark the center of the bottom side.
- Next, draw an arc from the upper right corner.
- Extend the bottom line to intersect the arc.
- Complete the rectangle.



Method 2

Use this method to draw different sized golden rectangles, once you have one known size.

- Draw the golden rectangle on a piece of paper.
- Draw a line through the diagonal of the rectangle and extend it.

Any rectangle on this diagonal will be a golden rectangle.