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### GOLDEN RATIO

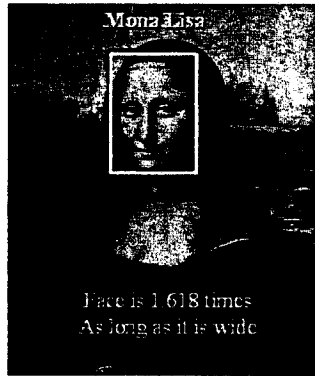
In the year 1202 the Italian mathematician Leonardo Fibonacci worked out a problem about rabbits having babies and discovered a pattern of numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, and so on. Every number in the pattern was the addition of the two that came before it:  $0+1=1$ ,  $1+1=2$ ,  $1+2=3$ ,  $2+3=5$ ,  $3+5=8$ ,  $5+8=13$ ,  $8+13=21$ , and so on. We see these Fibonacci numbers showing up over, and over, and over in nature.

If you ignore the zero, and divide a Fibonacci number into the one before it you get: 1, 2, 1.5, 1.67, 1.6, 1.625, 1.615, 1.619, 1.617, 1.618, 1.617, 1.618, 1.618, etc. After the first few, the answer is always close to 1.618. Now you might ask yourself, "So what? What does 1.618 have to do with anything?" Well, as it turns out, that's a very special number – so special, in fact, that it's called the "golden ratio".

The ancient Greeks based a lot of their art and buildings on the golden ratio (often shown as the Greek letter Phi  $\phi$ ). The length



of the Parthenon, for example, is a rectangle 1.618 times as long as it is wide (known as a golden rectangle). They also designed much of their pottery with the same ratio. Now why did they do that? They did it because they believed that this special ratio was much more pleasing to the human eye than any other ratio. Many of the great artists used the golden ratio in their art. For example,



Mona Lisa's face is 1.618 times as long as it is wide. Beautiful symphonies also have the same golden

ratio. The first movement is usually 1.618 times as long as the second one.

So why do we find that number so pleasing to the eye and to the ear? Do we find it beautiful because it copies creation, the work of the Master Artist, God? Could it be that the golden ratio is one of the blueprints God used in His creation? Let's look at a few of the other ways that the number 1.618 shows up over, and over, and over again throughout the universe.

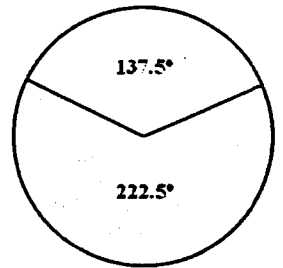
$\phi$  Each segment in your finger is roughly 1.618 times as long as the next one.

$\phi$  Your forearm is approximately 1.618 times as long as your hand.

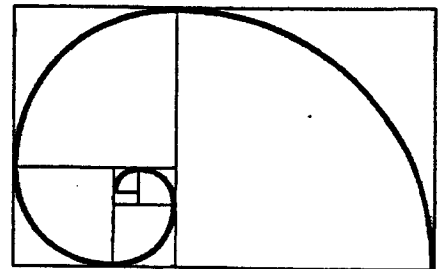
$\phi$  People with mouths 1.618 times as wide as their noses, are often considered the most beautiful.  
 $\phi$  In addition, the distance between their pupils is about 1.618 times as wide as their mouths.

The leaves and stems of some trees are arranged at 137.5 degrees from each other. That angle lets the sun shine on the greatest number of leaves. When you draw that angle

inside a circle, you get two pieces. Divide 137.5° into 222.5° and you get ...1.618!



If you make a spiral based on Fibonacci numbers, where every quarter turn is 1.618 times as far from the center as the previous one, you get what is known as a "golden spiral". Amazingly, most of the spirals found in nature are golden spirals. Look at the puzzle on the back page for just *some* of the golden spirals we find in living and non-living things.



The list of golden ratios goes on and on and on. From art and music to nature and science, 1.618 keeps showing up over and over. It is almost as if "Somebody" used that number as a measuring stick for the universe. It just can't be an accident. Many people call the golden ratio the "divine proportion" because it is clear only God could have done it!

