16 OCTOBER

1 750 years ago, Leonardo Fibonacci solved a puzzle about the numbers of breeding rabbits that might be produced. Mathematically he worked out that the numbers of pairs of rabbits, month by month, would be:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55....

2 What do we notice about these figures? Each is the sum of the previous two numbers.

3 The numbers 5, 8, and 13 occur in music: an octave (for example ‘C’ to ‘C’) covers 8 white notes and 5 black (13 in all) on the piano.

4 This ‘Fibonacci Series’ of numbers occurs throughout nature. We could look at plants with individual leaves coming out from a single stem. If we count the number of leaves from one leaf to the next that is directly above it, that will be a Fibonacci Number. It is the same with pine cones and a leafed cactus.

5 We can look at plants like the sunflower or the daisy. Counting the clockwise and then the anti-clockwise spirals of seeds or tiny flowers on the head of the plant, they will be consecutive Fibonacci Numbers.

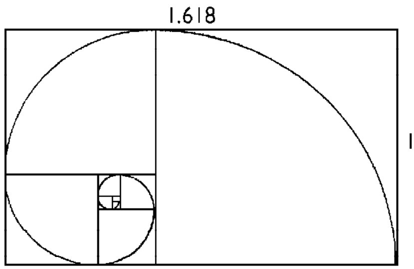
6 Dividing a Fibonacci Number by the previous Fibonacci Number gives a result close to 1.618 . The higher up we go in the Fibonacci Series, the more precise the result becomes. That number (a recurring decimal) is given the Greek letter “phi”:

$$\phi = 1.618034$$

7 Experiments have shown that buildings whose walls are in proportions that are 1 to 1.618 look “just right” to people - aesthetically they are the most pleasing to the eye. The Greeks knew this, and so much Greek art and architecture (such as the Parthenon in Athens) is based on these proportions which are called the *“Golden Ratio”* or *“Golden Mean”*.

8 Artists down the ages have often used the same proportions which they know are naturally appealing to the observer.

9 Within a *“Golden Ratio Rectangle”,* we could make a square that is based on one of the shorter sides. The remaining rectangle is then of exactly the same proportions as the original. That, too, can be divided into a square and rectangle, and that can be repeated, on and on. If diagonally opposite points in the squares are joined up to form a spiral, we get precisely the same spiral as a snail’s shell, a nautilus sea-shell, the flower of a rose, and a breaking wave on the sea-shore. The same proportions are seen in the great spiral galaxies of stars in space.



10 *Let us pray:*

Lord God,
may all that we see and discover
lead us to grow
in wonder and appreciation.
Amen.

✍ *Leonardo Fibonacci* (pronounced "fib-on-atch-ee")*, 1175-1250, was a contemporary of St Francis of Assisi (c. 1182-1226). Fibonacci was one of the first to introduce into Europe the Arabic-Hindu system of numbers that we now use and take for granted:*
0, 1, 2, 3, 4, 5, 6, 7, 8, 9
including the all-important concept of zero! Prior to his time, Roman numerals were still in use e.g.
CCLXIII plus XXXVIII = CCCI
which is much more easily understood if expressed in the form
263 + 38 = 301
in the Arabic-Hindu system that we now use! Try division or multiplication with Roman numerals!

✍ *Fibonacci had set a question. If a pair of rabbits take a month to mature, and then produce a new pair every month after that, what would be the total number of rabbits each month?*

Presuming that each pair is one male and one female and that no rabbits die, the following set of numbers is the result:
1,1,2,3,5,8,13,21,34,55,89,144,233....

✍ *Leonardo da Vinci's drawing* ("Vitruvian Man") *of a man with outstretched arms and legs within both a circle and a square, demonstrates the same proportions of* **Φ** *(phi) in the measurements from head to waist, from waist to feet, and from head to feet. The* "Divine Proportion" *and the* "Golden Section" *are other names for the* "Golden Mean".

✍ *In Van Gogh's painting, "Mother and Child", Mary's face fits perfectly into a* "Golden Rectangle"*. Use of the same proportions is seen in the work of more recent artists, e.g. with the Impressionist Georges Seuret. The innovative 20th Century architect, Le Corbusier, designed the rooms of multi-storey villas in the proportions of the* 'Golden Rectangle'.

✍ *Before Britain joined the international standard for paper sizes (e.g. A4, A5), British Imperial measurements included Foolscap paper, measuring 8 inches by 13 inches - two consecutive Fibonacci Numbers which, as we know, when divided give* **Φ** *(the* "Golden Ratio"*) producing that aesthetically pleasing* "Golden Rectangle".

✍ *Another curiosity is that*
whilst **Φ** *= 1.618*
its reciprocal (1divided by **Φ**) *= 0.618*
and its square = 2.618

𝄞 Oh the love of my Lord *("all the beauty I see")*

This is an excerpt from the page of this date in
'Praying Each Day of the Year',
a 3-volume book
by Nicholas Hutchinson, FSC.

For details:
http://www.matthew-james.co.uk/

Could make use of a search engine
to research this topic further.

This material is part of
the prayer and education website
of the De La Salle Brothers
in Great Britain:
www.prayingeachday.org