

Time-Interval Ratios Approximating the Logarithmic Base "e" Revealed in the Genesis Creation and Flood Accounts

Derek Marshall

B.A. Physics, 2006
East Lansing, MI. 48823
dmarshall@mtu.edu

© 2021 CreationFunction.com - All Rights Reserved

Abstract

Modern Young-Earth creation scientists cite numerous examples of fundamental constants and mathematical patterns found throughout Nature, such as the Golden Ratio, phi (ϕ), the Napierian logarithmic base "e," and the harmonic series, attributing their existence to a designer God. However, no connection has been made between these observed arithmetical entities and the 7-day Genesis creation account. To form a better view of the Creation account as a rotating, spiral pattern of a periodic nature, the harmonic series was assessed for suitability as a potential mathematical model for the Genesis Creation account. We found that seven step-wise iterations of the harmonic series generate a numerical pattern that produces time-interval ratios approximating the number "e." Additionally, an analysis of the Flood dates as reported in Genesis rendered similar time-interval ratios of the number "e." We show that the harmonic series' step-wise output and Genesis Flood periods exhibit a high correlation to the Fibonacci Series, a well-known sequence of integers observed in Nature's design. We also found similar time-interval ratios approximating phi (ϕ) in plant phyllotaxis and planetary orbits. We conclude that the fundamental constants "e," phi, and harmonic patterns observed in Nature are also seen in the Genesis Creation and Flood Accounts.

Keywords: Creation, Flood, Napierian, Exponential, Fibonacci, Phyllotaxis, Harmonic Series, Sequence, Logarithmic, Spiral, Golden Ratio

Introduction

To further characterize the Genesis creation account as a verifiable creation model of origins, we present a mathematical basis for the Genesis creation account. In science, we observe an orderly universe with periodicity and systems which obey laws, all of which we can express mathematically. We have noted mathematical patterns repeated throughout creation, and examples have been well-documented in creation science with their existence attributed to a creative God. The mathematical patterns we see in Nature are also seen in the Bible, specifically, those which correlate to the Napierian logarithmic base "e" and the Golden ratio, phi (ϕ). However, these unique numbers have not yet been connected to the Genesis Creation account. To realize a seven-day creation pattern with the same mathematical basis as seen in Nature itself would be a valuable step forward.

Physical Constants Embedded in Nature May Be the Fingerprint of a Creator

Recently, Dr. Don DeYoung and the late Dr. Glen Wolfrom published a book, "Mathematics: The Language of Creation," in which many examples of mathematical patterns are given to illustrate a Creation imbued with inherent order giving credence to the existence of a Designer. With these, DeYoung states that "we are observing the Creator's fingerprint on his world" (DeYoung and Wolfrom, 2017, Loc.1069). According to DeYoung, "Several intriguing physical constants are embedded in nature...One might suggest that these numbers were selected by God to shape the fabric of creation" (DeYoung and Wolfrom, 2017, Loc. 418). One example they give is the base of natural or "Napierian" logarithms, most commonly referred to as "e," or Euler's Number. This fundamental constant is an irrational number and carries the approximate value $e \approx 2.7183$.

Population Growth and Galactic Scale of Variations Follow an Exponential Model

Using an exponential base "e" growth model, it has been shown that a population only needs to double 32 times to achieve a population of 8.6 Billion people (White, 2006). In a population study of ancient Australia focusing on a similar period 5000 years ago, researchers compared the exponential growth model to their radiocarbon dating of rock shelters. They were able to fit their exponential "5 KA Acceleration Model" with a 97.3% correlation suggesting a noteworthy population explosion in Australia over the last 5000 years (Johnson and Brook, 2011). As generations directly after the Flood were propagated, the individual lifespans of these early individuals were decaying. Charles A. Glatt Jr. studied this lifespan loss and found that it followed an exponential decay model based upon the natural base "e" with a correlation coefficient of -0.850. Glatt summarized his findings in this excerpt from his Creation Research Society Quarterly paper "*Patriarchal Life Span Exponential Decay*":

"This single correlation between Genesis lifespans and the years following the Flood is of interpretable value to report again to review the work that has been done on this subject since 1948, to incorporate RATE project results, present the time-based analysis's [*sic*] correlation coefficient, express the natural (Napierian [*sic*], base e) curve as part of the family of the universe's most common curve, the logarithmic curve...(and) explore anomalies in relation to space expansion..." (Glatt, 2016).

From atoms to galaxies, the entire cosmos appears to progress exponentially when surveyed from a mass to size ratio standpoint. Figure 1 is a scatter plot that illustrates each demarcation of existence from atom to DNA to bacteria to insect to Man to planet to Star to galaxy. When the base-10 logarithm is taken for both the mass (m) and size (r) data on the $\log_{10}(\text{mass})$ and $\log_{10}(r)$ axis, the plot is linear with a correlation coefficient of 0.93 (Batarseh, 2008). This plot suggests that the big picture, "God's Eye" view of Creation is one that proceeds in scale with an unmistakable exponential character. Let us now examine these six literal days and nights of the Genesis creation account.

Figure 1: Logarithmic Scale of Variations

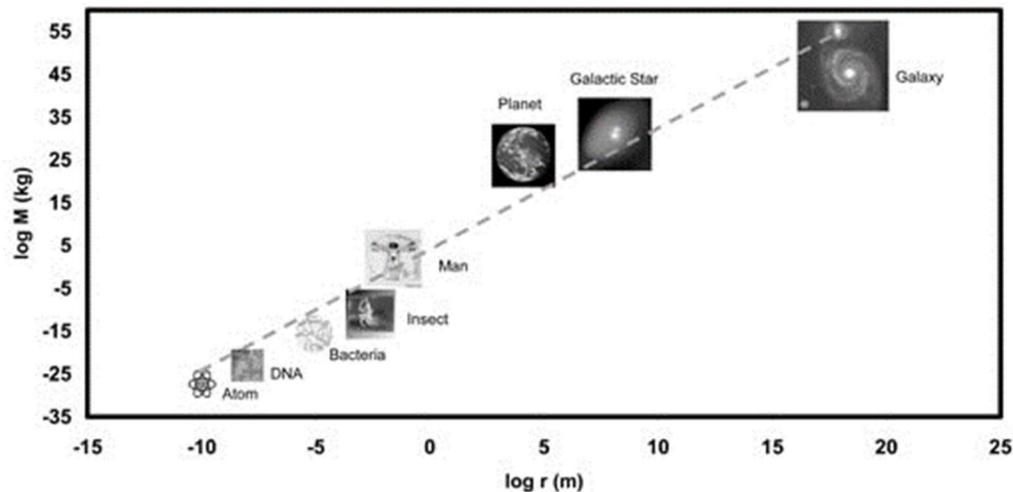


Figure 1 Logarithmic scale of variations of some of the structures found in our universe in mass (M) and size (r). Despite the vast differences in mass and size between these structures, this figure demonstrates the logarithmic correlation between mass and size in the universe. (Batarseh, 2008).

The Progression of Six Literal Days and Nights in Succession

There is theological debate on whether Creation days were literal, and scholars have not gained a consensus (Lewis, 1989). In recent times, the Young Earth Creation movement has solidified around the literal meaning of "Day," and for a good reason. An in-depth literary analysis was done by the late Dr. Gerhard Hasel, of Andrews University, and he concluded that these were indeed literal days:

"The author of Genesis 1 could not have produced more comprehensive and all-inclusive ways to express the idea of a literal "day" than the ones that were chosen. There is a complete lack of indicators from prepositions, qualifying expressions, construct phrases, semantic-syntactical connections, and so on, on the basis of which the designation "day" in the creation week could be taken to be anything different than a regular 24-hour day." (Hasel, 1994).

James Stambaugh made an interesting point about the semantics of the Creation account passage. It could be argued that God foreknew that this confusion would exist, and He phrased the Creation account in a repetitive, almost laborious manner on purpose:

"God, through the 'pen' of Moses, is being redundant for redundancy's sake. God is going out of His way to tell us that the 'days' of Creation were literal solar days. He has used the word *yôm* and combined this with a number and the words 'morning' and 'evening.' God has communicated the words of Genesis 1 in a specific manner, so that the interpreter could not miss His point. God could not have communicated the timing of creation more clearly than He did in Genesis 1." (Stambaugh, 1991).

These solar days are important because they imply physical rotation relative to a light source. There is no better definition of a "day" than one complete physical rotation of the Earth. Moreover, since the focus of the entire Genesis 1 creative act is the Earth, we suggest that the seven days were seven rotations of Creation. This view allows six discrete literal active days and considers that each step of Creation must take into account all of the other past steps and make room for the next steps. In Henry M. Morris' work *Scientific Creationism*, he states that "each stage was an appropriate preparation for the succeeding stage and for all of them the ultimate purpose of providing a suitable home for man" (Morris, 1985, p.209).

Harmony in Nature: Animals Already Formed Survived the Entire Creation Process

We suggest that creation proceeded without damaging what had been done already and summed together to form and inhabit the ultimate creation, human beings, with the latter being perfectly suitable to exist alongside and have dominion over the former. We know that each step of the Creation was right when it occurred and continued to be right up until and after the Creation process was completed. True harmony in Nature was characterized at each step by the statement "it was good." Later in this article, we will see how the harmonic series function produces a logarithmic spiral pattern that keeps proportion as it rotates and grows. This maintenance of proportion during growth could help contribute to an orderly creative act, allowing organisms already alive to survive the steps of creation that follow. There were 12 steps to "active" Creation, each "day" actually being comprised of a night and a day, or half-rotations. Four of these steps included living, moving creatures that had to survive the following steps. More specifically, the fowl and moving creatures of Day 5.0 and 5.5 survive the addition of land animals of Day 6.0 and 6.5. Since this harmony in nature argument is limited with its qualitative and linguistic nature, we will next apply the harmonic series equation to this 12-step process mathematically to see if there is any quantitative correlation to the Napierian logarithmic base "*e*," or phi, the Golden Ratio.

Table 1: The harmonic series Develops Time-Interval Ratios of the Natural Base "e."

Step	Harmonic Series Equation	n	S_n	Time Interval Ratio n_{step} / n_{step-1}	=	Compare to e
0	$\sum_{n=1}^{n=1} \frac{1}{n} = \left\{ \frac{1}{1} \right\}$	1	1	-	-	-
1	$\sum_{n=1}^{n=4} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right\}$	4	2.08	4/1	4	2.718
2	$\sum_{n=1}^{n=11} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{11} \right\}$	11	3.02	11/4	2.750	2.718
3	$\sum_{n=1}^{n=31} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{31} \right\}$	31	4.03	31/11	2.818	2.718
4	$\sum_{n=1}^{n=83} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{83} \right\}$	83	5.00	83/31	2.677	2.718
5	$\sum_{n=1}^{n=227} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{227} \right\}$	227	6.00	227/83	2.735	2.718
6	$\sum_{n=1}^{n=616} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{616} \right\}$	616	7.00	616/227	2.714	2.718
7	$\sum_{n=1}^{n=1674} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{1674} \right\}$	1674	8.00	1674/616	2.718	2.718
8	$\sum_{n=1}^{n=4550} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{4550} \right\}$	4550	9.00	4550/1674	2.718	2.718
9	$\sum_{n=1}^{n=12368} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{12368} \right\}$	12368	10.00	12368/4550	2.718	2.718

Table 1 Illustrates the step-wise output of the harmonic series. As the steps proceed, the ratio between the day-adjacent values of n_{step} approximates the Napierian logarithmic base e , and by the 7th step, the approximation is within 99.9%—these ratios of n_{step} form time-interval ratios of the number e .

The Harmonic Series and Sequence Creation Pattern: Time-Interval Ratios of the Natural Base "e"

The usual reading of the Genesis Creation account emphasizes what was created on a particular Creation day. These details are of utmost importance but do not represent all of the information gleaned from the story. We focus here on the mathematical pattern of twelve half-days of active Creation. We have established that a day is a rotation of Earth, which implies that days can be divided in half, and the whole active process may be analyzed as a sequence of twelve half-rotations. Furthermore, with rotational periodicity, we can graph the harmonic sequence and show that with each rotation, the step counts n increases by "e," the natural exponential base, creating a logarithmic spiral pattern time-interval ratio. The harmonic series is defined as the sum of an infinite series of constants $1/n$, where $n = 1, 2, 3, \dots$ and may be expressed in summation notation, as in equation (1):

$$(1) \sum_{n=1}^n \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n} \right\} = S_n$$

The exponential character of equation (1) is shown in Table 1. Under a step-wise analysis, every time S_n increases by 1, n will have increased by a factor approaching "e." We see for small n , the error is large, but in 7 iterations, the ratio n_{step}/n_{step-1} is within 0.028% error of the natural base "e." It is important to note here that for every rotation of the harmonic series, *the approximation of "e" improves significantly*. Table 1 also illustrates how the harmonic series can represent seven steps for seven days as it develops time-interval ratios of the natural logarithmic base "e." In Table 2, we apply the harmonic sequence to 12 half-days. The table features several columns of information as the 12 steps proceed, beginning with an initial uncounted step we refer to as "Day Zero." The Day Zero concept is not the focus of this paper, but it is included to illustrate how purely the harmonic series may be applied to the Creation Pattern and how it provides potential new clues as to the Creation's nature. Moreover, a desirable feature of a Creation model of origins is not only one that matches up with what we can see now but also inspires new ideas that promote new research.

The Harmonic Series Model of Creation: How it is Developed

We will go through one iteration of the Creation process. Referring to Table 2, the "Step" column of the first row begins with Day Zero's basis. From there, the second row of the table represents the first step, Night 1.0, during which the " n_{step} " column variable "2" is passed to the "harmonic series" equation. The equation output, known as the partial sum, S_n , is tabulated in the " S_n Step Finish" column, which in this case equals the partial sum "1.5". The sum was increased from 1.0 to 1.5, or a half-rotation, by the harmonic series equation. The next two columns, "Step Range" and "Fibonacci Compare," will be explained in the next section. The new partial sum "1.5" sets the process up for the next half-rotation represented in the third row of the table, Step "Day 1.5", passing the next " n_{step} " of 4 into the next harmonic series equation. This repeating process continues in the same fashion through Step "Day 6.5," the last half-day of Creation's active portion. The set of " n_{step} " numbers tabulated in (2) is essential because these are the numbers that create the complete half-rotations of Creation.

$$(2) \{1, 2, 4, 7, 11, 19, 31, 51, 83, 137, 227, 373, 616\}.$$

This repeating, expanding process creates the logarithmic spiral pattern seen in Figure 2. We graph the harmonic series using parametric functions. Using the harmonic series equation (1), we graph parametrically for $n = 1$ through 31:

Table 2: The Harmonic Series Equation Applied to 6-Day Active Creation

Step	n_{step}	Harmonic Series Equation	S_n Step Finish	$n_{step} - n_{step-1}$ Step Range	Fibonacci Compare
Day Zero	1	$\sum_{n=1}^{n=1} \frac{1}{n} = \left\{ \frac{1}{1} \right\} = S_n$	1	1	1
Night 1.0	2	$\sum_{n=1}^{n=2} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} \right\} = S_n$	1.5	1	1
Day 1.5	4	$\sum_{n=1}^{n=4} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right\} = S_n$	2.08	2	2
Night 2.0	7	$\sum_{n=1}^{n=7} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{7} \right\} = S_n$	2.59	3	3
Day 2.5	11	$\sum_{n=1}^{n=11} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{11} \right\} = S_n$	3.02	4	5
Night 3.0	19	$\sum_{n=1}^{n=19} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{19} \right\} = S_n$	3.55	8	8
Day 3.5	31	$\sum_{n=1}^{n=31} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{31} \right\} = S_n$	4.03	12	13
Night 4.0	51	$\sum_{n=1}^{n=51} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{51} \right\} = S_n$	4.52	20	21
Day 4.5	83	$\sum_{n=1}^{n=83} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{83} \right\} = S_n$	5.00	32	34
Night 5.0	137	$\sum_{n=1}^{n=137} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{137} \right\} = S_n$	5.50	54	55
Day 5.5	227	$\sum_{n=1}^{n=227} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{227} \right\} = S_n$	6.00	90	89
Night 6.0	373	$\sum_{n=1}^{n=373} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{373} \right\} = S_n$	6.50	146	144
Day 6.5	616	$\sum_{n=1}^{n=616} \frac{1}{n} = \left\{ \frac{1}{1} + \frac{1}{2} + \dots + \frac{1}{616} \right\} = S_n$	7.00	243	233

Table 2 illustrates the harmonic series's step-wise output and comparison to the Fibonacci Series. As the Day 6.5 Step Range diverges from Fibonacci 233, this is the step where the natural base "e" approximation becomes within 99.8%. The author is unaware of any Fibonacci Spiral Count of 233 that occurs in Nature.

$$(3) (x, y) = (n \cos[2\pi \text{ mod } 1[S_n]], n \sin[2\pi \text{ mod } 1[S_n]])$$

We take the modulus of S_n to isolate the remainder, which increases periodically from 0 to 1, and we multiply it by 2π to obtain an angle in radians. Now we can view the harmonic sequence as a succession of divisions of a parametric plot with the magnitude of (x,y) increasing with n , creating the spiral pattern in Figure 2. We arbitrarily limited the parametric plot of equation (1) to $n = 1, 2, 3, \dots, 31$ for the sake of clarity, with the understanding that plotting the full six days and nights would require the full sequence $n = 1, 2, 3, \dots, 616$, from Table 2. The set of integers (2) we tabulated from harmonic series equation (1) originates from every time the spiral plot touches or crosses the x-axis or "DAY/NIGHT" line. With this plot, we obtain a rotating, increasing pattern, which, as an equiangular, logarithmic spiral pattern, keeps its proportion as it grows (Thompson, 1961). This maintenance of proportion and harmony was vitally important for growing organic systems because living organisms were present while the 6-day Creation process was ongoing.

Figure 2: Harmonic Sequence Spiral

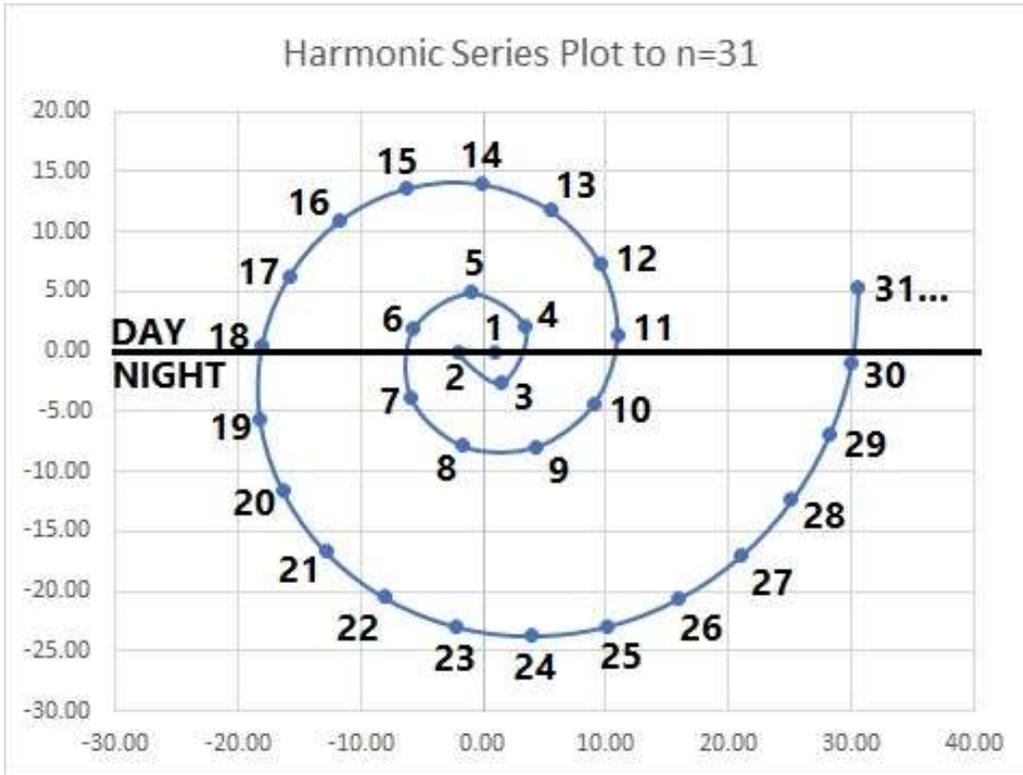


Figure 2 shows the harmonic sequence data to $n=31$. The harmonic sequence data is plotted parametrically on the x (DAY/NIGHT) and y (up and down) axes. The spiral's amplitude increases with n as the spiral turns around the z-axis (pointing into the page). Every time the spiral makes one complete rotation, representing one creation day, n increases by a factor approaching 2.718. These successive, daily increases of amplitude during the Genesis creation account represent time-interval ratios approximating the Napierian logarithmic base, e .

Time-Interval Ratios: What They Are and Why They Are Important

To understand what a "time-interval ratio" is, we must analyze its three aspects. First, the time-interval must represent a period, cycle, or rotation as in, for example, the period of "Day 3 of Creation." Not only is Day 3 of Creation such a period, but an investigation of Figure 2 also shows it to be a cycle and rotation. Secondly, the ratio must comprise values of time or a completed sequence, as in, for example, the ratio $(n_{step} = 31)/(n_{step-1} = 11)$ represented by Step 3 in Table 2. In this example, the ratios are those of completed sequences. Lastly, the ratio must closely correlate to an important fundamental constant, such as the Napierian logarithmic base "e," as does the step mentioned above with its approximation of 2.818 compared to "e," 2.718. Therefore, the n_{step}/n_{step-1} ratios featured in Table 1 are regarded here as *time-interval ratios* approximating the number "e." Table 1 summarizes our findings that mathematical modeling of the seven literal days of Creation form time-interval ratios which approximate "e" with the following days in succession. Furthermore, the approximation of "e" becomes increasingly accurate with each rotation. We have also found examples of time-interval ratios in the Genesis Flood Account.

The Genesis Flood Dates: Time-Interval Ratios of the Natural Base "e" are Found

There are also numerical examples of time-interval ratios which approximate "e" in the Genesis flood account. Bodie Hodge of *Answers in Genesis* tabulated the Jewish calendar dates and calculated the duration of each Flood stage referenced in Genesis chapters 7 and 8 (Hodge, 2010). We have introduced his data to our own Table 3. Since these are integer values that are subject to inclusive, exclusive, start, and ending considerations, +/- 1-day discrepancies will be pointed out and defended in the narrative. Furthermore, the durations gave that are not explicitly associated with a calendar datum are not incorporated. Arguments for or against Hodge's description of how the Flood proceeded are not discussed because the Jewish calendar dates present a clear beginning, middle periods, and ending to the Genesis Flood.

Time Interval Ratios in the Flood Account: The First 150-Day Period of Rain and Fountains of the Deep as the Flood Ramps-Up

Referring to Table 3, the first date given is 2/17, the 47th day of the Flood's first year. Our research has found it significant to include the first day of that year 1/1 in the table because it is implicit with the assertion of a date in a calendar-like fashion. The second calendar date is given in 7/17 of the same year, and its representative 150-day period is explicitly mentioned in the account. Hodge states that the 150-day period includes the initial 40 days (Hodge, 2010). Since the 110 days implied by Hodge is not explicitly associated with a calendar date, we place it in a separate column along with the 40-day entry in Table 3. These 150 days included two forms of flooding: rain and the broken-up fountains from below. Scripture states that for 40 of these 150 days and nights, it rained. Therefore, with these two distinct forms of flooding, whose magnitudes are given in units of time, it is plausible that we may characterize these two periods as a time-intervals. The ratio of 110 Days to 40 Days is a close 101.2% match to the natural base, "e," and with this, we obtain our first example of a time-interval ratio of the Napierian base in the Genesis Flood Account, as listed in Table 3.

Table 3: Time Spans Between Calendar Flood Events as Reported

Reference	Date Noah	Days	Total Days	Comment
Gen 7:11	1/1/600	0	0	Ark Assembly
Gen 7:11	2/17	47	47	Flood Begins/Rain/Fountains
Gen 7:24, 8:3,4	7/17	150	197	Ark Comes to Rest
Gen 8:5	10/1	73	270	Drying, First See Mtn. Tops
Gen 8:13	1/1/601	90	360	Remove Hull, See Dryness
Gen 8:14	2/27	57	417	Earth is Dry. Noah Disembark
Gen 7:12,17,8:6		40		Active Flood Time (Noah sees)
Gen 8:6		21		Bird Wait/Drying Time
Gen 7:24		110	150-40	150 Days includes the 40 Days
Gen 7:17 thru 8:6	2/17-10/21	150 +73 +21	244	Time from Extraction to Reoccupation (TETR)
Activity	Time Interval Ratio	=	Actual	Comment
Fountains/Rain	110/40	2.75	2.718	1.01 * Napierian Log Base <i>e</i>
Flooding/Drying 1	197/73	2.70	2.718	0.99 * Napierian Log Base <i>e</i>
TETR/Drying 2	244/90	2.71	2.718	1.00 * Napierian Log Base <i>e</i>
Drying 3/Bird Dry	57/21	2.71	2.718	1.00 * Napierian Log Base <i>e</i>
Total	-----	2.72	2.718	1.00 * Napierian Log Base <i>e</i>

Table 3 illustrates the periods of the Genesis Flood account. The upper section of the table lists the actual dates given in the narrative, and the number of days each period lasted. The middle section identifies periods that the Scripture mentions but does not supply an associated date. An exciting period included in this section is the Time from Extraction To Reoccupation (TETR). It represents the length of time between when the last animal entered the Ark to when the first animal finds rest in the Earth. The bottom section shows how all eight periods of the Flood exhibit time-interval ratios which approximate the number "e" with an associated period, based upon each number of days. If one takes these four ratios as exact, together they average 1.0008 * Napierian Log Base "e."

Time Interval Ratios in the Flood Account: The 73-Day Ramp-Down Period Compared to the 197-Day Total Ramp-Up

When we include the 47-day Ark assembly and loading period from 1/1 to 2/17 mentioned earlier with the 150 days just discussed, we obtain 197 days of total "ramping-up" activity. In this section, we will consider this total ramp-up period as our first time-interval. The next calendar date given in the narrative is 10/1 of that same year. The context of the Genesis 8 account suggests that these 73 days from 7/17 to 10/1 represent a ramp-down

period of the Flood. Regarding these two periods as associated time-intervals, we calculated the ratio of 197 Days ramp-up to this next period reported 73 Days given. We obtain another close 99.3% match to the natural base's time-interval ratio, in this case, the ramp-up to ramp-down ratio. We acknowledge that Hodge counts 74 days here, but he includes 10/1 in his count, where we do not, this resulting in 73 days. This 1-day "discrepancy" is resolved later in the Flood account when we give 57 days of final drying to Hodge's 56 days. The use of 73 days and 57 days in Table 3 gives better individual time-interval approximations of the natural base, "e." Table 3 shows how the final average of the four exact time-interval ratios obtained comes within 0.008% of "e." This low error percentage is a surprising result similar to our mathematical model of Creation improving with each iteration of the harmonic series.

The Time from Extraction to the Time of Reoccupation (TETR)

The next calendar date given is 1/1 of that following year. The context of Genesis 8 suggests that these final 90 days from 10/1 to 1/1 represent a continuing ramp-down period of the Flood. Over these 90 days, the water level decreases from the mountain-tops to the point at which Noah "sees" a dry Earth ready to occupy. God's perspective of the reoccupation of Earth may be the "big picture" of the Flood represented by the 150 days, the 73 days, and the first 21 days of these 90 we are discussing. According to Hodge's article, the 21-day bird period runs concurrently with the 90 days of water decrease (Hodge, 2010). This combination period, referred to here as TETR, is the 244 days from when the last organism was extracted from the Earth until the first organism reoccupied the Earth. The first animal to legitimately reoccupy the Earth was the dove that Noah released the third time. The dove did not return, having found rest according to Genesis 8:9,12. Regarding these two periods as associated time-intervals, we calculated the ratio of 244 Days to this next period reported 90 Days given. We establish that the time-interval ratio of the TETR period of 244 Days to the 90 Days of receding waters is a close 99.7% match to the natural base, "e."

Time Interval Ratios in the Flood Account: The 21-Day Bird Period and the Final 57 Days of Drying

The final Jewish calendar date given was 2/27 when God called Noah, his family and the animals that remained with him out of the Ark. Hodge shows that the Noah/bird period lasted 21 days and may have occurred in the final month of that first year, yet concurrently with our 90-day period (Hodge, 2010). We established that the ratio of 57 Days to this bird period reported of 21 Days is a very close 99.9% match to the natural base; it is a time-interval ratio of the number "e." Taken together, averaging the correspondence of each period of the Flood account to its respective fundamental constant "e" gives only 0.008% error. The existence of four time-interval ratios that approximate "e" in the Genesis Flood account adds weight to the argument that these ratios may also have been a part of the Genesis Creation account.

The Harmonic Sequence Parallels the Fibonacci Sequence

We have discovered that the harmonic series produces more than just time-interval ratios of "e." We performed a relatively simple numerical operation on the sequence of integers we obtain from the harmonic series. We discovered that the harmonic sequence closely follows the Fibonacci Sequence, a well-known numerical pattern observed throughout Nature. Refer to Table 2 to see the arithmetic we applied. For each "Step," there is a "Step Range" defined by subtracting the current n_{step} from the preceding n_{step-1} . An example would be Night 3.0 with its Step Range of 8. To visualize this, we refer to Figure 2, and we count the number of data points along the spiral that reside on the DAY side of the x-axis, beginning with n_{step-1} 11. We count the following points {11, 12, 13, 14, 15, 16, 17, 18} for a total of 8. Another example would be Day 3.5, with its Step Range of 12. We count the number of data points along the spiral on the NIGHT side of the x-axis, beginning with n_{step-1} 19. We count the following points: {19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30} for a total of 12. From all of the "Step Range" entries in Table 2, we obtain a new sequence of integers:

$$(4) \{1, 1, 2, 3, 4, 8, 12, 20, 32, 54, 90, 146, 243\}$$

If we compare this set of numbers with that of the "Fibonacci Compare" column:

$$(5) \{1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233\}$$

we find a 99.9% correlation. The numerical sequence (5) is commonly referred to as the Fibonacci Sequence or "Fibonacci Numbers," described by the Italian mathematician Leonardo Fibonacci in his 1202 book *Liber Abaci* (DeYoung, 2018). The Fibonacci Series creates an infinite sequence generated by adding two consecutive numbers in the sequence to get the next number. Even though this is a self-defined mathematical construct, we see these individual numbers or pairs and triplets of these integers in Nature, as in the populations of breeding rabbits, phyllotaxis of plants, sunflower seed heads, and in finance (DeYoung, 2018). Besides, these numbers are seen from the atomic scale through the astronomical scale. The fundamental electric charges are Fibonacci based, with values of $1/3$, $2/3$, 1 (Thornton, 2002). Fred Willson, of the *Good Science* program, stated regarding DNA:

"When we realize that the information to produce these spirals and numbers in living things is stored in DNA, should we then be surprised to find that the DNA molecule is 21 angstroms in width and the length of one full turn in its spiral is 34 angstroms, both Fibonacci numbers?" (Willson, 2002).

Fibonacci Numbers in Tree Phyllotaxis and Planetary Orbits Produce Time-Interval Ratios of $\phi^2 = 2.618$

The phyllotaxis examples in DeYoung and Wolfrom's *Mathematics: The Language of Creation* are impressive compared to how the harmonic series is brought forth in Figure 2. In phyllotaxis, angular leaf placement around an axis is determined by taking the ratio of two Fibonacci numbers, such that after a certain Fibonacci number of leaves, a complete 360° rotation around the axis is completed. In Table 4, with the phyllotaxis data, we also tabulated the ratios of planetary orbital periods. Each planet's orbital period around the Sun from Pluto to Mars is a Fibonacci fraction of its neighbor (Willson, 2002). In this context, we are reminded of Creation references Isaiah 40:22 and Proverbs 8:26 in which the words "circle," "compass," and "circuit" refer to the idea of orbit or spin, rather than that of a spherical globe (Herbert and Johnson, 2018).

Table 4: From Planets to Plants, Time-Interval Ratios are Observed

<i>The fraction of a circle between adjacent leaves on a stem</i>	<i>The angle between adjacent leaves</i>	<i>Periodicity of leaves (one rotation around the branch)</i>	<i>Plant Examples</i>	<i>Planetary Orbit Time Interval Ratio</i>	<i>The inverse of fraction, compare to ϕ^2 (2.618)</i>
1/2	180°	2	Elm, lime, linden, mulberry	Neptune: Uranus (2/1)	2
1/3	120°	3	Alder, beech, birch, blackberry, hazel	Uranus: Saturn (3/1)	3
2/5	144°	5	Apple, apricot, cherry, holly, oak, plum	Saturn: Jupiter (5/2)	2.5
3/8	135°	8	Pear, poplar, rose, sunflower, sycamore	Jupiter: Asteroids (8/3)	2.67
5/13	138.5°	13	Almond, white pine, willow	Asteroids: Mars (13/5)	2.6

Table 4. The influence of the Fibonacci numbers is seen on an astronomical scale and that of the plant world. Ratios of Fibonacci numbers determine the angle at which leaves are arranged around the axis of a branch. Phyllotaxis Data exhibit time-interval ratios of the number ϕ^2 . Planetary data exhibit time-interval ratios of the number ϕ^2 . Phyllotaxis after DeYoung and Wolfrom. Planetary ratios after Willson.

Time-Interval "Golden" Ratios Seen From Plants to Planets

Nevertheless, do Fibonacci phyllotaxis and orbital ratios in Table 4 represent *time-interval ratios*? To determine this, we must investigate these data to ascertain whether they fulfill the three aspects of time-interval ratios listed earlier. First, the time-interval must represent a period, cycle, or rotation. Phyllotaxis is how leaves or seeds are positioned around a stem. In table 4, leaves complete one rotation around the branch, or in the astronomy example, planets complete an orbit around the Sun, thus fulfilling the first condition. Secondly, the ratio must be comprised of values of time or completed sequence. In this example, the ratios are those of completed sequence and time because the completed sequence of leaves counted to make one rotation of the stem. Alternatively, it would represent the number of days required for a planet to orbit the Sun in astronomy. Lastly, the ratio must closely correlate to a fundamental constant. In Table 4, the ratios listed approximate $\phi^2 = 2.618$, similar to how our previous examples approximate "*e*" = 2.718. The Golden Ratio, phi (ϕ), is also regarded in creationist literature as a fundamental constant (DeYoung and Wolfrom,

2017). Therefore, the phyllotaxis ratios featured in Table 4 are regarded here as *time-interval ratios* approximating the number $\phi^2 = 2.618$, and that time-interval ratios not only exist in the Genesis creation and Flood accounts but also exist in Nature.

Potential Arguments Against the Application of the Harmonic Series to the Genesis Creation Account

One could argue that we are attempting to extract from the Genesis creation account a hidden mathematical code. Although we do not characterize our findings as a mathematical "code," a potential objection to codes in Scripture is found in Isaiah 45:19, "I have not spoken in secret..." Interestingly, there are other passages from the same prophet that describe how God created the Earth, and attribute to its construction clearly stated concrete mathematical concepts. One such passage is from the same prophet Isaiah 40:26:

"Lift up your eyes on high, and behold who has created these things, that brings out their host by number: he calls them all by names by the greatness of his might, for that he is strong in power; not one fails."

Here, Isaiah comforted Israel by reminding them that their God created the heavens and did so much like a general would line up his troops for war. From *Strong's Exhaustive Concordance of the Bible*, The Hebrew word for "number" used here is "*miçpâr*," an arithmetical term for number or enumeration. Regarding the term "hosts," Albert Barnes notes:

"The word here alludes to the fact that the heavenly bodies seem to be marshalled, or regularly arrayed as an array; that they keep their place, preserve their order, and are apparently led on from the east to the west, like a vast army under a mighty leader..." (Barnes et al., 2005)

Merriam Webster's Collegiate Dictionary defines the noun form of the word "array" as "a number of mathematical elements arranged in rows and columns." Therefore, according to the prophet Isaiah, the application of an array of numbers to the Genesis creation account is not artificial. Additionally, four verses earlier, the prophet writes in Isaiah 40:22:

"It is he that sits on the circle of the earth, and the inhabitants thereof are as grasshoppers; that stretches out the heavens as a curtain, and spreads them out as a tent to dwell in:"

Many readers mistake this term "circle of the Earth" as evidence of the Bible's foretelling that Earth is round, but "circle" in this passage is the same Hebrew word translated "compass" in Prov 8:27 and "circuit" in Job 22:14. It implies that this Hebrew word "*chûg*" in Creation's context is more descriptive of the Earth's orbit and spin, rather than its shape (Herbert and Johnson, 2018). This Biblical evidence gives weight and credibility to our mathematical idea of six days being six rotations of a logarithmic spiral as plotted in Figure 2, a graphical representation of the step-wise sequence or "array" obtained from equation (1).

Are These Harmonic Sequences Arbitrary?

One could argue that the elements of the sequence (2) generated by the harmonic series are arbitrary, meaning that any series of numbers can be generated with a different seed number, which also forms time-interval ratios of the number "e." To answer the possibility that sequence (2) is merely an arbitrary set of numbers, we refer again to Table 2, which shows that the series of numbers obtained from the harmonic series is virtually identical to the Fibonacci Series. With the harmonic sequence's strong correlation to the Fibonacci sequence, we submit that the harmonic series' numerical output does not appear to be an arbitrary sequence of integers.

Harmonic Series "Virtually Identical" to Fibonacci Series. Why No One-to-One Correspondence?

One could inquire why the harmonic sequence's step-wise output (4) does not exhibit one-to-one correspondence to the Fibonacci sequence (5). Dr. Harry Wiant, in his CRSQ article, stated that "*almost* without fail, counts may be observed which are adjacent numbers in the Fibonacci sequence (e.g., 5 right, 8 left)" (Wiant, 1973). It indicates that not all phyllotaxis of plants in which we expect Fibonacci spiral counts feature Fibonacci-based parastichy. The Royal Society studied how common the Fibonacci spiral counts were in the well-known Sunflower seed head. It was determined that most of the seed heads were indeed Fibonacci, but there were significant examples of Fibonacci +/-1 (Swinton et al., 2016). The existence of Fibonacci +/-1 in a viable plant may suggest that the set of harmonic sequence (4), with its Fibonacci +/-1 character, could offer a more fundamental basis for the progression of Nature. It is well-known that not all plant phyllotaxis feature Fibonacci numbers (Jean, 1994). There exist other known sequences of numbers involved in plant phyllotaxis that exhibit Fibonacci *structure*, such as the Lucas Sequence:

$$(6) \{1, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322\}$$

Like the Fibonacci sequence, those sequences that exhibit Fibonacci structure also develop interval ratios approximating the Golden Ratio, ϕ (Swinton et al., 2016). In those cases of plants in which the phyllotaxis angles depart from the Golden Angle of 137.51° , (i.e., $360^\circ/\phi^2$), the angle can be estimated by adding to $\phi = 1.618$ the amount which the sequence departs from Fibonacci. For example, in the Lucas sequence (8), the *limit divergence angle* is 99.5° (Okabe, 2015). These and similar angles can be estimated using equation (7):

$$(7) 360^\circ / (\phi + \alpha) = \text{limit divergence angle (LDA)},$$

Where, (after values from (Jean, 1994, Table 2.1))

$\phi = 1.618$, the Golden Ratio

$\alpha = 2$ for Lucas Sequence, a normal (1,3) Sequence: LDA = 99.5°

$\alpha = 3$ for normal (1,4) Sequence: LDA = 78.0°

$\alpha = 4$ for normal (1,5) Sequence: LDA = 64.1°

$\alpha = 5$ for normal (1,6) Sequence: LDA = 54.4°

$\alpha = 6$ for normal (1,7) Sequence: LDA = 47.3°

Although this article is not meant to be an exhaustive investigation of plant parastichy, it is felt instructive here to note that all of the "normal" phyllotactic sequences noted in Jean, 1994, Table 2.1 are directly related to ϕ , either via equation (7) or by taking the half-angle of its result. The ratios and angles of adjacent elements of sequences with Fibonacci

structure all represent time-interval ratios of phi, whether they exhibit a one-to-one correspondence to the Fibonacci series or not.

"Artificiality Argument": Imposing a Mathematical Model Where None Exists?

Another question that could be raised here is why we are artificially imposing upon the Genesis creation account mathematical ideas where no such arithmetical information exists. Furthermore, one could say that even though numerical evidence in Table 3 does exist in the Genesis Flood account, the Flood and Creation are separate events. Therefore, any numerical evidence from the Genesis Flood applies to the Flood only. However, when one compares and contrasts these two significant events in Genesis, it becomes clear that they are indeed very similar. In the context of the Creation separating the waters from dry land and the Flood recombining the waters and dry land, Don Batten writes:

"This illustrates a common biblical principle: a judgment is a reversal of creation. So the Flood reverses the events of Genesis 1 where land and sea were separated. And Jeremiah 4:23 speaks of a judgment so severe that it's like reversing the creation back to the unformed and unfilled state of Genesis 1:2" (Batten, 2011)

If the Genesis Flood Reversed Creation Using Time-Interval Ratios of the Number "e," Then the Creation Must Have Also Exhibited Time-Interval Ratios of "e."

There also exists numerical evidence of Batten's "judgment reverses creation" argument in the context of the Genesis creation and Flood. An examination of Harmonic sequence (4) and Flood dates from Table 3 strengthens Batten's argument by showing that the Creation harmonic tetrad (8),

(8) {54, 90, 146, 244}

obtained from Harmonic sequence (4) correlates 90.5% to four of the Flood periods of Table 3:

(9) {57 days, 90 days, 73 days, 243 Days}.

Table 5 illustrates how these tetrads further correspond to four elements of the Fibonacci sequence (5). The second Flood period of 73 days does relate to the $n = 146$ term of the sequence (4), being precisely one-half. More research is needed to investigate how the $n = 146$ term relates to selecting what was to be judged by the Flood. Reading Genesis 6:7, it is clear that God was intent on destroying a particular set of creation:

"And the LORD said, I will destroy man whom I have created from the face of the earth; both man, and beast, and the creeping thing, and the fowls of the air; for it repenteth me that I have made them."

Moreover, 2 Peter 2:5 states that the ancient world was destroyed by the Flood, except Noah and his family:

"and did not spare the ancient world, but preserved Noah, a preacher of righteousness, with seven others, when He brought a flood upon the world of the ungodly;"

Furthermore, it was water that destroyed the world, 2 Peter 3:6:

"Whereby the world that then was, being overflowed with water, perished:"

Moreover, water that saved Noah and the occupants of the Ark, according to 1 Peter 3:20:
"... in the days of Noah, while the ark was a preparing, wherein few, that is, eight souls were saved by water."

Table 5: Flood Judgement Reverses Genesis Creation Days 6 and 5

<i>Creation Day, (Step Range, Table 2)</i>	<i>What was Created, Genesis 1</i>	<i>Flood Account Days (Table 3)</i>	<i>What was Judged, Genesis 7, 8</i>	<i>Fibonacci Sequence (5)</i>
Day 6.5 (n=243)	Man	244, from 150+73+21	Man	233
Day 6.0, (n=146)	Land Animals	73, half of 146, see Figure 3	Land Animals, Ark occupants not judged	144
Day 5.5, (n=90)	Moving Creature	90	Moving Creature	89
Day 5.0, (n=54)	Fowl	57	Fowl	55

Table 5. The Flood judgment reverses Creation Days 6.5, half of 6.0, 5.5, 5.0, when Man, land animals, moving creatures, and fowl were judged, respectively. Day 6.0 is an example of the Flood judgment's specificity, during which the portion of the Creation selected for the judgment was spared (also see Figure 3).

There are similar instances in Scripture in which God both saves and kills via water. One example is Exodus when a channel is made through the Red Sea for the Israelites to pass. It is our opinion that God also made a "channel" through the Flood judgment via the Ark. Figure 3 illustrates this idea by comparing the harmonic series data from Table 2 to the Flood dates. There appears to be a 73-unit knockout area in which the judgment passed over the occupants of the Ark. Using Batten's "judgment reverses creation" argument numerically and applying Genesis 6:7 above, we should expect some area of refuge from God's Flood judgment to appear in the figures, and we see such an aperture in Figure 3. Therefore, the Genesis Flood judgment not only appears to have reversed creation using time-interval ratios which approximate the number "e" but by number as well, with the correlation of the creation harmonic tetrad (8) and the Flood period tetrad (9). This reversal appears so specific that we may have identified a numerical gap in the judgment, i.e., a safe space in which the Ark resided, and by which, the same was spared. More research is needed to fully investigate the nature of this 73-unit discrepancy between tetrads (8, 9).

Figure 3: Comparing the Genesis Flood to the Creation: A 73-unit Zone of Protection?

Flood Judgement: Begins 2/17 - 10/21, 150 + 73 + 21 Days = 244 Days	Zone of Protection? 73 Days	Flood: 7/17 - 10/1 = 73 Days	Flood: 10/1 - 1/1 = 90 Days	Flood: 1/1 to 2/27 Ending = 57 Days
Creation Day 6.5, Man, CF = 243	Creation Night 6.0: Land Animals, CF = 146	Creation Day 5.5: Moving Creature, CF = 90	Creation Night 5.0: Fowl, CF = 54	

Figure 3 The upper row represents the Flood Judgement tetrad (9). It is compared to the harmonic series tetrad (8) (referred to above as "CF") in the lower row. Notice the 73-unit "Zone of Protection" that the Ark may have occupied during the Flood judgment. We apply the idea that God judged a specific set of His creation, except the Ark's occupants, who were technically members of the set to be judged. We should expect to see the mechanism by which they were spared, as we have in the other examples of judgments in Scripture. More research is needed to investigate this 73-unit knockout area.

Summary

From the Genesis Creation account, we developed a mathematical model using the harmonic series from which we obtained time-interval ratios which approximate the number "e" and found these to be very similar to the time-interval approximations of "e" found in the Genesis Flood account. We showed that this same series parallels the Fibonacci sequence and that plant phyllotaxis and planetary orbits based upon Fibonacci also exhibit time-interval ratios of another fundamental constant phi, φ, also known as the Golden Ratio. We presented several potential arguments against the harmonic series' application to the Genesis Creation account and offered rebuttals to each. We conclude that we observe the mathematical constants "e," "phi," and the harmonic series in Nature because these same mathematical constants and patterns are evident in the Genesis Creation and Flood accounts which are the foundations of our world.

References

Barnes, A., Murphy, J.G, Cook, F.C., Pusey, E.B., Leupold, H.C., Frew, R. 2005, *Barnes Notes*, Vol. 6: Isaiah, Baker Books, Grand Rapids, MI

Batarseh, K. I. 2008. The Primordial Seed of Life: Creation, Spontaneous Generation, and Emergence Theory, *CRSQ* 44(3):195-202

Batten, D. 2011, Adam & Noah: Two Beginnings, *Creation* 34(1):12-14

DeYoung, D. B. 2015. Mathematical Beauty, *Creation Matters*, 20(6), CRS

DeYoung D. B. Wolfrom, G.W., 2017. "*Mathematics: The Language of Creation*," First Edition (e-Book), CRS Books.

DeYoung, D. B. 2018. Fibonacci Numbers, *Creation Matters*, 23(1), CRS

- Glatt, C. A. 2016. Patriarchal Life Span Decay, *CRSQ* 52(3):165-176.
- Hasel, G. F. 1994. The "Days" of Creation in Genesis 1: Literal "Days" or Figurative "Periods/Epochs" of Time? *Origins* 21(1):5-38
- Herbert, J., and James J.S. Johnson, 2018, Do Isaiah 40:22 and Psalm 29:10 Speak to Cosmological Realities? Considering the "Waters Above" and Earth's Cosmic Choreography. *CRSQ* 55(1):44-48
- Hodge, B., 2010. "Biblical Overview of the Flood Timeline," August 23, 2010, <https://answersingenesis.org/bible-timeline/biblical-overview-of-the-flood-timeline/>
- Jean R.V. 1994. *Phyllotaxis: a systemic study in plant morphogenesis*. Cambridge, UK: Cambridge University Press.
- Johnson, C. N., Brook, B.W. 2011. Reconstructing the dynamics of ancient human populations from radiocarbon dates: 10 000 years of population growth in Australia. *Proc Biol Sci.* 278(1725): 3748–3754.
- Lewis, J. P., 1989. The Days of Creation: An Historical Survey of Interpretation. *Journal of the Evangelical Theological Society.* 32(4): 433-455
- Morris, H. M., 1985. "Scientific Creationism," *ICR*, Master Books.
- Okabe, T., 2015. Biophysical optimality of the golden angle in phyllotaxis. *Sci. Rep.* 5, 15358
- Stambaugh, J., 1991. The Days of Creation: A Semantic Approach, *Journal of Creation* 5(1):70–78.
- Swinton, J., and Ochu, E., 2016. Novel Fibonacci and non-Fibonacci structure in the sunflower: results of a citizen science experiment. *R Soc Open Sci.* 3(5)
- Thompson, D., 1961. *On Growth and Form*, Cambridge University Press
- Thornton, S. T., Rex, A., 2002. *Modern Physics for Scientists and Engineers*, 2nd Ed., Brooks/Cole.
- White, M., 2006. Billions of People in Thousands of Years? *Answers Magazine*, AiG.
- Wiant, H. V., 1973. Relation of southern pine cone spirals to the Fibonacci sequence. *CRSQ* 9(4):218-219.
- Willson, Fred, 2002. Shapes, Numbers, Patterns, And the Divine Proportion in God's Creation. *Acts & Facts.* 31(12).