Ancient Numbers Cross Number Puzzle

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>999</td>
<td></td>
<td>38</td>
<td>396</td>
<td>45</td>
<td>51</td>
<td>100</td>
<td>60</td>
<td>130</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>169</td>
<td></td>
<td>110</td>
<td>112</td>
<td>120</td>
<td>140</td>
<td>170</td>
<td>180</td>
<td>130</td>
<td>140</td>
</tr>
</tbody>
</table>

puzzle created by Janet Teeguarden
jteeguar@yahoo.com
Ancient Numbers Cross Number Puzzle

ACROSS
1. 999 999 999 999
2. DCLXV
3. CCXXIII
4. 二千三百二
5. 三
6. 四百六
7. CXX
8. ⬆️ 🖱️
9. 🖱️
10. CCXXIII
11. ⬆️
12. 999 999 999 999 999
13. ⬆️
14. 999 999 999 999 999
15. 四百六
16. ⬆️
17. CCXXIII
18. CXX
19. ⬆️ 🖱️

DOWN
2. ⬆️
3. MMMMCCCXII
4. 六十八
5. 六
6. ⬆️ 🖱️
7. MCMLXIV
8. ⬆️
9. ⬆️
10. 四百六
11. ⬆️
12. 四百六
13. ⬆️
14. ⬆️ 🖱️
15. 四百六
16. ⬆️
17. CCXXIII
18. CXX
19. ⬆️ 🖱️

puzzle created by Janet Teeguarden
jteeguar@yahoo.com
Number Stories of Long Ago

AMATYC Oct 31, 2021
Janet Teeguarden

Published 1919
NUMBER STORIES
OF LONG AGO

CHAPTER I

HOW CHING AND AN-AM AND MENES
COUNTED

The logs are burning in the great stone fireplace in the cottage by the sea. The Story-Teller sits in his easy-chair looking at a book of curious pictures and still more curious letters. She of the teasing ways is dancing through the open door, and with her are the others who make up what she calls the Crowd, tired with the hours of play upon the beach.

“Just one little story before bedtime,” says the Tease.

“Just one,” chime in the others.

“Not a single word,” says he of the book with the curious pages.

“Oh, just one,” says the Tease.
*One
*Two
*Many
*Ching
* One
* Two
* Three
* Many
* An-am
One
Two
Three
Four
Many

*Menes*
Many centuries later.....
In Ancient Egypt

*Story Time....
* Ca 3000 BC - 300 BC

* Ahmes
* Heiroglyphics, Base Ten
An additive system

* In Egypt... 3000 BC
Decimal Egyptian Number Symbol

1 = \[\underline{\text{staff}}\]
10 = \[\underline{\text{heel bone}}\]
100 = \[\underline{\text{coil of rope}}\]
1000 = \[\underline{\text{lotus flower}}\]
10,000 = \[\underline{\text{pointing finger}}\]
100,000 = \[\underline{\text{tadpole}}\]
1,000,000 = \[\underline{\text{astonished man}}\]
*Egyptian numeral for 4124
*Can you write the Egyptian numerals for

* 32
* 1,243
* 121,036

**Egyptian Numerals**

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Egyptian Number Symbol</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>staff</td>
</tr>
<tr>
<td>10</td>
<td>𓍈 10</td>
<td>heel bone</td>
</tr>
<tr>
<td>100</td>
<td>𓍈 100</td>
<td>coil of rope</td>
</tr>
<tr>
<td>1000</td>
<td>𓍈 1000</td>
<td>lotus flower</td>
</tr>
<tr>
<td>10,000</td>
<td>𓍈 10,000</td>
<td>pointing finger</td>
</tr>
<tr>
<td>100,000</td>
<td>𓍈 100,000</td>
<td>tadpole</td>
</tr>
<tr>
<td>1,000,000</td>
<td>𓍈 1,000,000</td>
<td>astonished man</td>
</tr>
</tbody>
</table>
*Question:

* Ahmes can write the number for 1,000,000 with just 1 symbol, the “astonished man!”

But just one number less ????

* How many symbols would Ahmes have to use to write the number 999,999?

* Egyptian Numerals
*Cross Number Puzzle

* (Work together)

*Egyptian Numerals
In Babylon in Mesopotamia
*Ca 3000 - 2000 BC*

*Lugal*
ANCIENT MESOPOTAMIA

Euphrates River
Mediterranean Sea
Tigris River
Dead Sea
Nile River
Red Sea
Persian Gulf

Ur.

FERTILE CRESCENT

Cradle of Civilization

Mediterranean Sea
Caspian Sea

Ancient Mesopotamia is located in the fertile region between the Tigris and Euphrates Rivers. It includes cities such as Ur, which is considered the cradle of civilization.
* Pressed a pointed stick on damp clay

* Cuneiform symbols - (Wedge-shaped)
Two distinct symbols were used, a unit symbol and a ten symbol.

*Babylonian Numeration*
* First to use place value
* Base 60 system
* But NO Zero!

**Babylonia (Babylon)... 2000 BC**
**Base 60 Place Values**

<table>
<thead>
<tr>
<th>Base</th>
<th>Value</th>
<th>Place Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$60^3$</td>
<td></td>
<td>216000’s</td>
</tr>
<tr>
<td>$60^2$</td>
<td></td>
<td>3600’s</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>60’s</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1’s</td>
</tr>
<tr>
<td>3600s</td>
<td>60s</td>
<td>1s</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[]</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>[]</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>[]</td>
<td>[]</td>
<td>[]</td>
</tr>
<tr>
<td>[]</td>
<td>[]</td>
<td>[]</td>
</tr>
</tbody>
</table>

*Babylonian Numerals*
$1x60^3 + 57x60^2 + 46x60 + 40x1$

* Babylonian 424,000
Cross Number Puzzle
(Work together)

Babylonian Numerals
In Ancient China

Story Time......
* 4000 - 2000 BC

Ancient China
Chinese Civilization from Its Origins to the Tang Dynasty

Chang
ANCIENT CHINA: Map

Use the following maps to help you label the following on your map:
- History Alive pgs. 198, 202, 238, 263, 428
- Rand McNally Classroom Atlas pg. 93
- A Message of Ancient Days pg. 263

Land:
- Gobi Desert
- Himalayas Mountains
- Mount Everest
- North China Plain
- Plateau of Tibet
- Sichuan Basin (Szechwan Basin)
- Taklimakan Desert
- Tian Mountains
- Turfan Depression
- Yunnan Plateau

Water:
- East China Sea
- Mekong River (draw it in yourself)
- South China Sea
- Yangtze River / Chiang Jiang (both)
- Yellow River / Huang He (write both)
- Yellow Sea

Cities:
- Xi'an (Xianyang)

Historical Sites:
- Great Wall (draw it in yourself)

LEGEND: shade each a different color
- Mountains
- Peak
- Desert
- River
- Lowland
- Basin
- Plain
- Plateau
- Ocean
- Other land in China
* Rod Numerals on a Counting Board
* Used from before the Han Dynasty (206 BC-220 AD) to 16th Century

* China
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>十</td>
<td>干</td>
<td>百</td>
<td>千</td>
<td>万</td>
<td>亿</td>
<td>兆</td>
<td>十</td>
<td>干</td>
<td>百</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>100</td>
<td>1000</td>
<td>10000</td>
<td>$10^8$</td>
<td>$10^{12}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Complex Numerals
The complex numerals are used on cheques, banknotes and coins and are the equivalent of writing 'one', 'two', 'three', etc, rather than 1, 2, 3. The simple numerals are used for everything else.
Instead of using place value, they insert a symbol (for 10, 100, 1000, etc) to name the value of the symbol.
一百二十三
壹佰貳拾叁

※ 123, Simple and Complex
*Cross Number Puzzle*

* (Work together)

*Chinese Numerals*
In Ancient Greece

Story Time....
* Ca 700 BC
* Two systems
  * Acrophonic (Attic)
  * Alphabetic (Ionic)
* Hippias
*Ancient Greece*
### The Attic Numerals

<table>
<thead>
<tr>
<th>Greek Letter</th>
<th>Value</th>
<th>Attic Numerals</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>I</td>
<td>4</td>
</tr>
<tr>
<td>Γ</td>
<td>5</td>
<td>ΓI</td>
<td>6</td>
</tr>
<tr>
<td>Δ</td>
<td>10</td>
<td>ΓII</td>
<td>9</td>
</tr>
<tr>
<td>Π</td>
<td>50</td>
<td>ΔΔI</td>
<td>21</td>
</tr>
<tr>
<td>Η</td>
<td>100</td>
<td>XXXΓΗΔΔΔΙΙΙ</td>
<td>3633</td>
</tr>
<tr>
<td>Ρ</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Χ</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ψ</td>
<td>5000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Μ</td>
<td>10000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is an additive system very similar to the Roman numerals.
1982 and 4672 in Attic Greek
(Acrophonic)
**Greek Ionic (Alphabetic) Numerals**

<table>
<thead>
<tr>
<th>#</th>
<th>Greek</th>
<th>Roman</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>α α</td>
<td>α α</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>β β</td>
<td>β β</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>γ γ</td>
<td>γ γ</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>δ δ</td>
<td>δ δ</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>ε ε</td>
<td>ε ε</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>ζ ζ</td>
<td>ζ ζ</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>η η</td>
<td>η η</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>θ θ</td>
<td>θ θ</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>ι ι</td>
<td>ι ι</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>υ υ</td>
<td>υ υ</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>κ κ</td>
<td>κ κ</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>λ λ</td>
<td>λ λ</td>
<td>30</td>
</tr>
<tr>
<td>40</td>
<td>μ μ</td>
<td>μ μ</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>ν ν</td>
<td>ν ν</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>ξ ξ</td>
<td>ξ ξ</td>
<td>60</td>
</tr>
<tr>
<td>70</td>
<td>ο ο</td>
<td>ο ο</td>
<td>70</td>
</tr>
<tr>
<td>80</td>
<td>π π</td>
<td>π π</td>
<td>80</td>
</tr>
<tr>
<td>90</td>
<td>θ θ</td>
<td>θ θ</td>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#</th>
<th>Greek</th>
<th>Roman</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>ρ ρ</td>
<td>ρ ρ</td>
<td>100</td>
</tr>
<tr>
<td>200</td>
<td>σ σ</td>
<td>σ σ</td>
<td>200</td>
</tr>
<tr>
<td>300</td>
<td>τ τ</td>
<td>τ τ</td>
<td>300</td>
</tr>
<tr>
<td>400</td>
<td>υ υ</td>
<td>υ υ</td>
<td>400</td>
</tr>
<tr>
<td>500</td>
<td>φ φ</td>
<td>φ φ</td>
<td>500</td>
</tr>
<tr>
<td>600</td>
<td>χ χ</td>
<td>χ χ</td>
<td>600</td>
</tr>
<tr>
<td>700</td>
<td>ψ ψ</td>
<td>ψ ψ</td>
<td>700</td>
</tr>
<tr>
<td>800</td>
<td>ω ω</td>
<td>ω ω</td>
<td>800</td>
</tr>
<tr>
<td>900</td>
<td>π π</td>
<td>π π</td>
<td>900</td>
</tr>
</tbody>
</table>
* In modern Greece, alphabetic numerals are still used for ordinal numbers and in contexts similar to those in which Roman numerals are still used elsewhere in the West.

* Greek Ionic (Alphabetic) Numerals
And in Jerusalem...
<table>
<thead>
<tr>
<th>Letter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleph</td>
<td>1</td>
</tr>
<tr>
<td>Beth</td>
<td>2</td>
</tr>
<tr>
<td>Gimel</td>
<td>3</td>
</tr>
<tr>
<td>Daleth</td>
<td>4</td>
</tr>
<tr>
<td>He</td>
<td>5</td>
</tr>
<tr>
<td>Vau</td>
<td>6</td>
</tr>
<tr>
<td>Zayin</td>
<td>7</td>
</tr>
<tr>
<td>Cheth</td>
<td>8</td>
</tr>
<tr>
<td>Teth</td>
<td>9</td>
</tr>
<tr>
<td>Yod</td>
<td>10</td>
</tr>
<tr>
<td>Kaph</td>
<td>20</td>
</tr>
<tr>
<td>Lamed</td>
<td>30</td>
</tr>
<tr>
<td>Mem</td>
<td>40</td>
</tr>
<tr>
<td>Nun</td>
<td>50</td>
</tr>
<tr>
<td>Samech</td>
<td>60</td>
</tr>
<tr>
<td>Ayin</td>
<td>70</td>
</tr>
<tr>
<td>Pe</td>
<td>80</td>
</tr>
<tr>
<td>Tsaddi</td>
<td>90</td>
</tr>
<tr>
<td>Koph</td>
<td>100</td>
</tr>
<tr>
<td>Resh</td>
<td>200</td>
</tr>
<tr>
<td>Shin</td>
<td>300</td>
</tr>
<tr>
<td>Tau</td>
<td>400</td>
</tr>
<tr>
<td>Koph</td>
<td>500</td>
</tr>
<tr>
<td>Mem</td>
<td>600</td>
</tr>
<tr>
<td>Nun</td>
<td>700</td>
</tr>
<tr>
<td>Pe</td>
<td>800</td>
</tr>
<tr>
<td>Tsaddi</td>
<td>900</td>
</tr>
</tbody>
</table>

*Daniel*
*In the Ancient Roman Empire

*Story Time....
*753 BC - 476 AD*
Ancient Roman Empire
I     V    X    L    C    D    M
1     5    10   50   100  500  1000

Example:
1,944 = MDCCCCXXXXIII = MCMXLIV

*Roman Numerals*
Using Roman numerals, the sum $1,223 + 1,114$ becomes:

\[
\text{MCCXXIII} + \text{MCXIV} = \text{MCXXIII} + \text{MCXIII} \\
\text{M} \quad \text{CC} \quad \text{XX} \quad \text{III} \\
+ \quad \text{M} \quad \text{C} \quad \text{X} \quad \text{III} \\
= \quad \text{MM} \quad \text{CCC} \quad \text{XXX} \quad \text{III} \\
= \quad \text{MMCCCXXXVII} = 2,337
\]

*Addition - oh my!*
http://www.illustrationsof.com/clock-clipart

*What’s wrong here?
Cross Number Puzzle

(Work together)

Roman Numerals
Ancient Mayan Civilization

Story Time....
250 AD - 900 AD
(Early Maya 2000 BC - 250 AD)
Ancient Maya
* Only 3 symbols
* Base twenty (mostly)
* First to use a symbol for zero as a place holder (36 BC)
* Vertical numbers

* Mayan - 300 AD
Mayan
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

Mayan positional number system
* 18 x $20^3$ (144000’s)
* 18 x $20^2$ (7200’s)
* 360’s (18 x 20)
* 20’s
* 1’s

*Mayan Place Values*
\[(1) \times 20 \times 18 \times 20 + (3) \times 18 \times 20 + (1+5) \times 20 + (2+3 \times 5) \]
\[\underline{8417}\]

\[(2+5) \times 20 \times 20 \times 18 \times 20 + (0) \times 20 \times 18 \times 20 + (3+2 \times 5) \times 18 \times 20 + (0) \times 20 + (4+5) \]
\[\underline{1,012,689}\]
Cross Number Puzzle
(Work together)

Mayan Numeral System
*Today's Numbers (Hindu-Arabic)*

*The rest of the story...*
Today’s Numbers
(Hindu-Arabic)

* It seems to us that after the invention of writing the largest discovery was the use by humanity of the so-called decimal notation.

M. V. Ostrogradsky (1801-1862)
Arithmetica, Gregor Reisch 1503. A Symbolic Image: Boethius and Pythagoras in a mathematical Competition. Pythagoras uses an Abacus, while Anicius Manlius Severinus Boethius (480 AD-524 AD) uses Numerals from India. Boethius looks very proud, he is ready while the poor Pythagoras still tries to find the solution.
India to Arabic/Islamic Peoples to Europe (ca 1200 AD) (thanks to Fibonacci)
* MacTutor website - http://www-history.mcs.st-and.ac.uk/
  (But just type MacTutor in your browser and then click on History Topics Index)

* Look at Indian Mathematics and Arabic Mathematics
  (Click on Indian numerals and Arabic numerals)

*Thank you for coming!

*See WHOVA app for POWERPOINT ANSWER KEY to the cross-number puzzle

jteeguar@yahoo.com