阿僧祇究竟是多大？

**How Large is One Asamkhyeya?**

**Written and Translated by Bhikshu Jin Yong**


世親菩薩著，玄奘大師中譯的《阿毘達磨俱舍論》[4]第三別分世品論及六十數：『有一無餘數始為一，一十為十，十百為百，十百為千，千千為○，○千為萬，萬○為○為度，○○為度。此數中忘失餘八。』此六十數為十進位，十為度模，阿僧祇是所列的五十二數中的最大數，故一阿僧祇為10^{59}。

根據此論，忘失的八數都比阿僧祇大，翻譯名義大集[7]更列出此八數的名稱（見佛光佛學辭典【五十二數】條）。如忘失的八數都比阿僧祇小[5][18]，則一阿僧祇為10^{59}。換言之，一阿僧祇介於10^{51}及10^{59}之間，視忘失八數的大小而定。

然而，般若法師（西元768年）翻譯的四十華嚴[9]第十卷列有144個數字，阿僧祇是第125大數。經文節錄如下：『所謂百千為一洛叉；一百洛叉為一俱胝；俱胝俱胝為阿閦多；阿閦多阿閦多為一那由他…』由此可計算出一洛叉等於10^4，一俱胝為10^{10}，一阿閦多為10^{20}，一那由他為10^{40}。

Asamkhyeya is a Sanskrit word that appears often in the Buddhist texts. For example, Shakyamuni Buddha is said to have practiced for three great asamkhyeya kalpas before becoming a Buddha. Asamkhyeya means 'incalculable'; however, is it really too large to calculate? Ding Fubao (丁福保), Fuguo (佛光), and Sootheil/Hodous[1] Buddhist Dictionaries all state that one asamkhyeya is equal to 10 to the power of 47 (10^{47}), while Buddhism A to Z[2], among others, states to 10 to the power of 59 (10^{59}). The Flower Ornament Scripture[3] (Avatamsaka Sutra) translated from Chinese into English by Thomas Cleary states an incalculable (asamkhyeya) is equal to 10 to the power of 2.03 x 10^{32} (10^{20,986,585,220,637,305,510,651,276,820,480}). Which one is correct then?

Vasubandhu's Abhidharmakosha[4][5] talks about 60 numbers from 1 up, with 10-fold consecutive increases; however, eight numbers are missing from the list. The Chinese version translated by the Venerable Xuan Zang makes it very clear that asamkhyeya is the largest one in the list of 52 numbers[6]. One asamkhyeya is thus equal to 10^{51}. Mahavyutpatti[8] further lists these eight missing numbers (also see 杜撰聖華二十數 in Fuguo Dictionary). However, one asamkhyeya may be equal to 10^{59}, if all eight missing numbers are smaller than it[5][8]. Or one asamkhyeya may be somewhere between 10^{51} and 10^{59}, depending on where the eight missing numbers are located.

On the other hand, Roll 10 of the Gandavyuha[9] translated from Sanskrit into Chinese by Prajna (768 C.E.) lists 144 numbers and asamkhyeya is the 125th one. It states: “100,000 makes one laksha, 100 lakshas makes one koti. A koti of kotis makes one ayuta. An ayuta of ayutas makes one nayuta…” Hence 1 laksha equals to10^4, 1 koti equals to10^7, 1 ayuta equals to10^{11}, 1 nayuta equals to10^{28}, and1...
east of 10⁷, one could be 10⁷⁴, one by him as 10³⁸, ..., one
Aranyakas are 10⁷.44 x 10³⁷ thousand (10⁷⁴, 436, 800, 000, 000, 000, 000, 000)
0,000,000,000,000,000,000,000), which is greater than Kosha’s numbers.

Chapter 30 (Roll 45) of the Avatamsaka Sutra⁴ with 80 rolls translated from Sanskrit into Chinese by Shikshananda (652-710 C.E.) lists 124 numbers and asamkhya is the 105th one. It starts the same as Gandhavyuha: “100 lakshas makes one koti. A koti of kotis makes one ayuta. An ayuta makes one nayuta...” except it does not specify how large a laksha is. If we also take 1 laksha as 100,000 (Foguang Buddhist Dictionary, Kosha²⁵, ²⁶), then 1 koti equals to 10⁷, 1 ayuta equals to 10⁴, and 1 asamkhya equals to 10 to the power of 7.10 x 10³¹ (10⁷³, 436, 831, 270, 800, 000, 000, 000, 000), Cleary translated this Sutra into English; however, he took 1 laksha as 10ⁱ⁰, and 1 laksha of lakshas is 1 koti or 10⁵⁸hence, Cleary came up to 10 to the power of 2.03 x 10³² (10²⁴, 986, 535, 220, 637, 805, 510, 651, 276, 820, 488) for an incalculable (asamkhya), greater than the present calculation.

Chapter 25 (Roll 29) of the Avatamsaka Sutra¹³ with 60 rolls, the earliest Chinese translation, translated by Buddhabhadra (359-429 C.E.) lists 122 numbers and asamkhya is the 104th one. The list is very similar to that translated by Shikshananda except it is short of the 10¹⁰ and the greatest (124th) terms. It also takes 1 laksha as 10⁵; however, 1 laksha of lakshas is 1 koti or 10⁵⁸. Hence 1 asamkhya equals to 10 to the power of 5.07 x 10⁴ (10⁵³, 706, 024, 009, 129, 200, 000, 000, 000, 000), smaller than the above calculations.

Table 1 summarizes the above discussion plus a couple of extra commonly seen numbers.

In conclusion, one asamkhya may be as small as 10⁵¹ or as large as 10⁷⁴, 436, 800, 000, 000, 000, 000, 000, 000, 000, 000, 000, 000, 000, or somewhere in between, depending on the text source. The upper bound is based on Gandhavyuha whose sequence of numbers is most extensive among all sources.

Notes:
* On p. 480 of Pruden’s translation, the sixteenth place should read the sixtieth place instead. Also on the same page, laksha (1000,000) should read 100,000 instead.
# This number is indeed too large to be calculated with a personal computer as rightly pointed out by Mochizuki (IABS 2008); however, its power can still be accurately computed.
+ An abbreviated list of these numbers also appears in Roll 65 (Chap 39) of this Sutra. 本級第65卷亦較簡略地列出這些數字。
Table 1. Comparisons of Some Numbers from *Kosha* and Various *Avatamsaka Sutras* (numbers listed are powers of 10)

<table>
<thead>
<tr>
<th></th>
<th><em>Kosha</em></th>
<th><em>Gandavyuha</em></th>
<th>60 Rolls <em>Avat.</em></th>
<th>80 Rolls <em>Avat.</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>洛叉 Laksha</td>
<td>5</td>
<td>5</td>
<td>5*</td>
<td>5*</td>
</tr>
<tr>
<td>俱胝 Koti</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>那由他 Nayuta</td>
<td>11^^</td>
<td>28</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>阿僧祇 Asamkhya</td>
<td>51-59</td>
<td>7.44 x 10^{17}</td>
<td>5.07 x 10^{21}</td>
<td>7.10 x 10^{21}</td>
</tr>
<tr>
<td>不可說 Ineffable</td>
<td>--</td>
<td>4.88 x 10^{22}</td>
<td>3.32 x 10^{26}</td>
<td>4.65 x 10^{26}</td>
</tr>
<tr>
<td>不可說不可說</td>
<td>--</td>
<td>1.95 x 10^{23}</td>
<td>1.33 x 10^{27}**</td>
<td>1.86 x 10^{27}</td>
</tr>
<tr>
<td>Ineffable Ineffable</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^ Called 百千；稱為『百千』
* Assumed value; 設定值
^^ Called 那庾多；稱為『那庾多』
** Called 不可說轉轉；稱為『不可說轉轉』

References 參考資料:
1. Soothill and Hodous’ *Dictionary of Chinese Buddhist Terms*.