Mathematics in the Torah
Parashat Ki Tissa: The 13 Principles of Mercy

The verses
In Parashat Ki Tissa we read about how God revealed the 13 Principles of Mercy to Moses following the sin of the Golden Calf. The 13 Principles are taken from the following three verses,¹

*Havayah* came down in a cloud; He stood with him there, and proclaimed the name *Havayah*. *Havayah* passed before him and proclaimed: “*Havayah! Havayah*, a God compassionate and gracious, slow to anger, abounding in kindness and faithfulness. Extending kindness to the thousandth generation, forgiving iniquity, transgression, and sin and He cleanses all, but does not remit all punishment, but visits the iniquity of parents upon children and children’s children, upon the third and fourth generations.”

And in the original Hebrew:

וַיֵּרֶד הָעָנָן וַיִּתְיַצֵּב עִמּוֹ שָׁם וַיִּקְרָא בְשֵׁם הָוִּי:
וַיַּעֲבֹר הָוִּי עַל־פָּנָיו וַיִּקְרָא אֵ הוֹי — ל רַחוּם וְחַנּוּן אֶרֶךְ אַפַּיִם וְרַב־חֶסֶד וֶאֱמֶת.
נֹצֵר חֶסֶד לָאֲלָפִים נֹשֵׂא עָוֺן וָפֶשַׁע וְחַטָּאָה וְנַקֵּה.

It has been passed down from Moses at Sinai that these verses contain exactly 13 measures of principles of God’s Divine mercy. The sages identify these 13 measures as being described by the words, “a God compassionate and gracious, slow to anger, abounding in kindness and faithfulness. Extending kindness to the thousandth generation, forgiving iniquity, transgression, and He cleanses all” (אֵל רַחוּם וְחַנּוּן אֶרֶךְ אַפַּיִם). However, it is not at all clear why the measures of mercy would not continue. We might further ask if there is some kind of mathematical allusion to the fact that there are 13 measures.

The first thing to note is that within these verses there lies an equidistant skip of 39 letters that form God’s essential Name, *Havayah*—the Name of Divine mercy. 39 is the value of “*Havayah* is one” (יְהוָה מא). The total number of letters included in this equidistant skip is thus 121. We have included the letter וָ at the end of the page to more easily recognize the source in the verses.

The total value of these 121 letters is 6210, which is the value of 30 times “light” (אור) as well as 10 times the value of “crown” (כתרא) in Aramaic, which are also the initial

¹. Exodus 34:5-7.
letters of the first four words in Parashat Ki Tissa (כִּי תִּסָּא). If we were to add the letter vav preceding these 121 letters (and completing the first word), the total will come to 6216, which is the product of 7 and 888, or 24 times “yechidah” (יחידה), the highest part of the soul. 888 is the value of the words, “I Havayah do not change” (אני הוי' לא שניתי) as well as the words, “He has put an end to darkness” (כִּי טָמַשְׁנָה).

Now, if we count the total number of letters in these three verses we discover that they number 169, which is 13², a clear and wondrous allusion to the tradition that there are 13 Principles of Mercy. Furthermore, the first two verses contain 91 letters and the third verse contains 78 letters. This is the division of the square of 13 into the triangle of 13 and the triangle of 12, following the first algebraic rule about the relationship between square numbers and triangular numbers:

\[ n^2 = \Delta n \cdot \Delta (n - 1) \]