Converse Theory of the Binomial Theorem.

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[Abstract.]

The method of extracting any root may be understood from the subjoined example of extracting the fifth root of 2,073,071,593.

$$(x+y)^5 = x^5 + 5x \times {}^4y + 10x^3y^2 + 10 \times {}^2y^3 + 5 \times y^4 + y^5.$$

	$\overline{20730}\ \overline{71593}$ (73 = required root.
7^5 =	16807
$5 \cdot 7^4$ = 12005)	39237 (3
$5 \cdot 7^4 \cdot 3$ =	36015
	32221
$10 \cdot 7^3 \cdot 3^2$ =	30870
	13515
$10 \cdot 7^2 \cdot 3^3$ =	13230
	2859
$5 \cdot 7 \cdot 3^4$ =	2835
	243
3^5 =	243
	0

Note : The given number is divided into periods of *five* digits beginning from the place of unity. The *fifth* power of the greatest number possible (7) is subtracted from the left hand period. This number is the first digit of the root required. To the remainder (3923) the first figure of the next period (7) is affixed. This number is then divided by *five* times the *fourth* power of the first digit of the root and the quotient is the second digit of the root. The formation of the various divisors following is obvious from the expansion of $(x+y)^5$.

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