Trivial Mathematics: Solution

I. Find the values of the constants:

1. $A = 301$ (Game that can be won in $R - V$ throws (but no fewer))

2. $B = 47$ (Smallest number that is a Keith, Carol, and Lucas number)

3. $C = 259$ (Decimal representation of K, if K is interpreted as a hexadecimal number)

4. $D = 2$ (Half of the name of a band who peaked at number $P + I$ on the *Billboard* Hot 100 in 1992 with a song called H (spelled out))

5. $E = 66$ (Order that serves a major plot point in *Star Wars: Episode* $N - G$)

6. $F = 20$ (Episode number in which "I will not do that thing with my tongue" is written repeatedly)

7. $G = 17$ (Least random number)

8. $H = 1$ (Building connected to building L and building $G - U$)

9. $I = 8$ (Largest perfect power that is one less than a perfect power)

10. $J = 2$ (Admittees to MIT's class of 2017 with an SAT math score in 600–640)

11. $K = 103$ (A reversed)

12. $L = 5$ (Nickname of a comic-strip character whose last name is 95472)

13. $M = 18$ (Ed Sheeran-penned song from the album *Four*)

14. $N = 20$ (Biological Engineering)

15. $O = 13$ (Triskaidekaphobes' fear)

16. $P = 2\ (\sum_{i=0}^{\infty} \frac{1}{2^i})$

17. $Q = 4383347$ (Patent number for a "Four-bar linkage door hinge")

18. $R = 19$ (Smallest palindromic Roman numeral made from more than one distinct character)

19. $S = 223$ (Only positive integer that cannot be written as the sum of fewer than 37 positive fifth powers)

20. $T = 8$ (How many times U has been retired in Major League Baseball)

21. $U = 14$ (Year of the Roman census in which 4,937,000 citizens were recorded)

22. $V = 13$ (Number on a Tarot card whose Rider-Waite version features a pale horse)

23. $W = 10753$ (NW 11th & Johnson, to a Portland public-transit app)

II. Plug the constants into the formula:

$$\left(ABL\left(D^J\left(CIM + V\right)\left(EQ + G\right)\left(KP\left(FNU + S\right)\left(TW + \frac{J}{R - H}\right) + O\right) + R\right)\right)^H$$

$$= 3151316151992051916122119151 45$$

III. Split 3151316151992051916122119151 45 into 1- and 2-digit numbers each in $\{1, 2, ..., 26\}$:

3 15 13 16 15 19 9 20 5 19 16 12 21 19 15 14 5

IV. Apply the substitution $1 \mapsto A, 2 \mapsto B, \ldots, 26 \mapsto Z$:

COMPOSITESPLUSONE

V. Take the values of the constants in positions $4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22$ (the composite-numbered positions)—$D, F, H, I, J, L, N, O, P, R, T, U, V$—and add 1 to each:

$$\begin{array}{c} 2\ 20\ 1\ 8\ 2\ 5\ 20\ 13\ 2\ 19\ 8\ 14\ 13 \\ \downarrow \\ 3\ 21\ 2\ 9\ 3\ 6\ 21\ 14\ 3\ 20\ 9\ 15\ 14 \end{array}$$

VI. Apply the substitution $1 \mapsto A, 2 \mapsto B, \ldots, 26 \mapsto Z$ to get the final answer:

CUBIC FUNCTION

Miscellanea

D The band is U2

F The show is *The Simpsons*

I $2^3 = 8$ and $3^2 = 9$ are actually the *only* such pair of perfect powers—a fact first proved in 2002 (Mihăilescu)

L "5" (né 555 95472) is from *Peanuts*

M The song is by One Direction

N The MIT course number

S The generalization of $g(5) = 37$ was conjectured (by Leonard Euler's eldest son Johann) to be $g(n) = 2^n + \left\lfloor \left(\frac{3}{2}\right)^n \right\rfloor - 2$—so far shown at least for $n \leq 471600000$