Number Pattern

$$1^3+5^3+3^3=153$$
$$16^3+50^3+33^3=165033$$
$$166^3+500^3+333^3=166500333$$
$$1666^3+5000^3+3333^3=166650003333$$

The number pattern can continue, can you prove this using algebra?

The proof is as follows:

$$\left(\frac{10^n-4}{6}\right)^3+\left(\frac{10^n}{2}\right)^3+\left(\frac{10^n-1}{3}\right)^3$$

$$=\frac{1}{6^3}\left[(10^n-4)^3+27(10^n)^3+8(10^n-1)^3\right]$$

$$=\frac{1}{6^3}\left[\begin{array}{c}(10^{3n}-12\times 10^{2n}+48\times 10^n-64)+27\times 10^{3n}\\ +(8\times 10^{3n}-24\times 10^{2n}+24\times 10^n-8)\end{array}\right]$$

$$=\frac{1}{6^3}\left[36\times 10^{3n}-36\times 10^{2n}+72\times 10^n-72\right]$$

$$=\frac{1}{6}\left[10^{3n}-10^{2n}+2\times 10^n-2\right]$$

$$=\frac{1}{6}\left(10^{3n}-4\times 10^{2n}\right)+5\times 10^{2n-1}+\frac{10^n-1}{3}$$

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