\[78 = 77 + 1\]

Abundant

Sweth triangular number. \(\left(\frac{12+1}{2}\right) = 78\)

\[78 = 2 \cdot 39 = 3 \cdot 26 = 6 \cdot 13\]

\[78 = 2 \cdot 3 \cdot 13\]

Smallest numbers that can be written as the sum of 4 distinct squares in 48 ways:
\[
\begin{align*}
78 &= 7^2 + 5^2 + 2^2 + 0^2 \\
78 &= 7^2 + 4^2 + 3^2 + 2^2 \\
78 &= 6^2 + 5^2 + 4^2 + 1^2 \\
78 &= 8^2 + 3^2 + 2^2 + 1^2
\end{align*}
\]

Dimension of exceptional Lie algebra.
(Others are 14, 52, and 133, 248 only)

\[78 = 2^2 + 5^2 + 7^2 \text{ uniquely}\]

Smallest with seven ways as sum of 2 primes:
\[78 = 5 + 73 = 7 + 71 = 11 + 67 = 17 + 61 = 19 + 59 = 31 + 47 = 37 + 41\]

Adoreal

Congruent number.