

MEI Maths Item of the Month

January 2021
Happy 2021

What is the longest string of consecutive positive integers that adds to 2021?

Solution

2021 can be written as the sum of 47 consecutive positive integers:

$$\begin{aligned} &20+21+22+23+24+25+26+27+28+29+30+31+32+33+34+35+36+37+38+39+40+41+42+43+ \\ &44+45+46+47+48+49+50+51+52+53+54+55+56+57+58+59+60+61+62+63+64+65+66 \\ &= 2021 \end{aligned}$$

Any odd number, n , can be written as the sum of p consecutive integers whose mean is q where $n = pq$.

2021 is the product of 2 primes: $2021 = 43 \times 47$ and so can only be written as the product of two numbers in one of two ways: 1×2021 or 43×47 . The 2021 consecutive integers with mean 1 will include negative integers therefore the longest string of consecutive positive integers will be the 47 integers with mean 43.