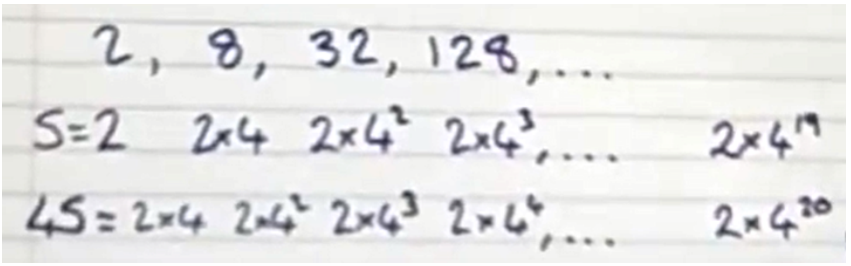
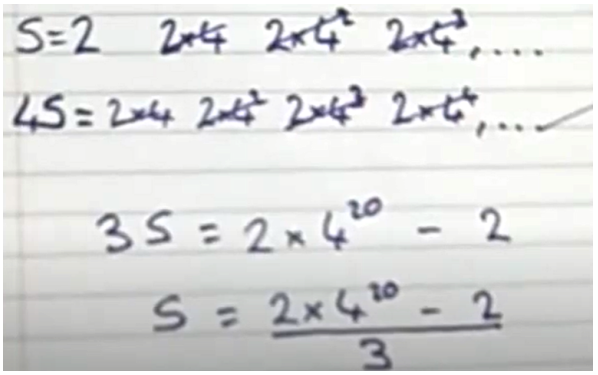
In the video at nrich.maths.org/8054, Alison works out the sum of the first twenty terms of the sequence:

2, 8, 32, 128, 512 …

Here are two shots from the video:





Can you adapt Alison's method to sum the following sequences?

- 3, 9, 27, 81, 243, … up to the 15th term
- 5, 10, 20, 40, 80, … up to the 12th term
- $\sum_{i=1}^{20} \left(3 \times 2^{i-1}\right)$
- $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, … up to the 10th term

Can you find an expression for the following sum up to the nth term?

$$a,\ ar,\ ar^2,\ ar^3,\ \ldots$$