

# Calculus II

## Guess sequence formula, part 1

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## Example (Sequences via f-las: guess f-la from terms)

Find a formula for the general term  $a_n$  of the sequence

$$\left(0, \frac{1}{4}, -\frac{2}{8}, \frac{3}{16}, -\frac{4}{32}, \frac{5}{64}, \dots\right)$$

$$a_1 = 0, a_2 = \frac{1}{4}, a_3 = -\frac{2}{8}, a_4 = \frac{3}{16}, a_5 = -\frac{4}{32}, a_6 = \frac{5}{64},$$

- The numerators start at 0 and go up by one with each term.
- The  $n^{\text{th}}$  term has numerator  $n - 1$ .
- The denominators start at 2 and double with each term.
- The  $n^{\text{th}}$  term has denominator  $2^n$ .
- The signs of the terms alternate between positive and negative.
- We take this into account by multiplying by  $(-1)^n$ .

$$a_n = (-1)^n \frac{n-1}{2^n}$$