



example

geometric series















second term =  $ar$



$$r = \frac{\text{term 2}}{\text{term 1}} = \frac{10/4}{-10} = -\frac{1}{4}$$

first term =  $a$



# geometric series

## example

Find the sum of the series  $\sum_{n=1}^{\infty} \frac{(-1)^n 10}{4^{n-1}}$

- We identify the values of  $a$  and  $r$
- The series expands to

$$\sum_{n=1}^{\infty} \frac{(-1)^n 10}{4^{n-1}} = -10 + \frac{10}{4} - \frac{10}{16} + \dots$$

first term =  $a$

second term =  $ar \implies r = \frac{\text{term 2}}{\text{term 1}} = \frac{10/4}{-10} = -\frac{1}{4}$

- Double check:  $ar^{n-1} = \frac{(-1)^n 10}{4^{n-1}}$

- Since  $|r| < 1 \implies \sum_{n=1}^{\infty} \frac{(-1)^n 10}{4^{n-1}} = \frac{a}{1-r} = \frac{-10}{1-\frac{(-1)}{4}} = -8$

harmonic series