Example 4 part 2

- Ok, we have

$$\mathbb{P}(F = n) = \frac{1}{2^n}, n \geq 1.$$

- Is this a probability distribution?
- Yes!

$$\sum_{n=1}^{\infty} \mathbb{P}(F = n) = \sum_{n=1}^{\infty} \frac{1}{2^n} = \frac{1/2}{1 - 1/2} = 1.$$

- Probability of an even number of flips?

$$\mathbb{P}(\{2, 4, 6, 8, 10, \dots\}) = \sum_{\substack{n=1 \\ n \text{ even}}}^{\infty} \frac{1}{2^n}$$

$$= \sum_{k=1}^{\infty} \frac{1}{2^{2k}} = \sum_{k=1}^{\infty} \frac{1}{4^k} = \frac{1/4}{1 - 1/4} = \frac{1}{3}.$$