

**Suppose that women who live beyond the age of 80 outnumber men in the same age group by three to one. How much information, in bits, is gained by learning that a person who lives beyond 80 is male?**

$E = \text{"a person who lives beyond 80 is male"}$

$$\mathbb{P}(E) = \frac{1}{4}$$

$$I(E) = -\log_2(\mathbb{P}(E)) = -\log_2 \frac{1}{4} = 2 \text{ bits}$$