Week 2/ Exercise 3

- 30 people in a room
- Uniform distribution of birth dates

a) Compute the probability that no two people share a birthday

$P(x) = 1/365$ (being born on x)

$P(\text{not } x) = 1 - \frac{1}{365}$ (not being born on x)

Pick one person's birthday x.
P(their birthday = x)

P(next person not x) $= 364/365$
↳ their birthday is y

P(next person not x or y) $= 363/365$

⋮

P(next person no shared) $= 365-29/365$

P(no shared bdays) $\left(\frac{365 \cdot 364 \cdots 336}{365^{30}}\right)$

↳ Probabilities are independent so we multiply them to get AND

$\approx$ 29% chance

b) Probability that at least two people share a birthday

$P(n \geq 2) = 1 - P(\text{no shared birthday})$

$\approx$ 71% chance.