Answer on Question #40365, Math, Statistics and Probability

Three people are selected at random. Find the probability:

a. All three share the same birthday.

b. None of the three shares the same birthday.

Solution

a. The chance that 2 people have the same birthday is

$$\frac{1}{365}.$$

If there are 3 people the probability that third person have the same birthday is

$$\frac{1}{365} \cdot \frac{1}{365}.$$

So the probability that all three persons share the same birthday is

$$P(\text{All three share the same birthday}) = \frac{1}{365} \cdot \frac{1}{365} = 0.00000751.$$

b. If there are 2 people, the chance that they do not have the same birthday is

$$\frac{364}{365}.$$

So the chance that they do have the same birthday is

$$1 - \frac{364}{365}.$$

If there are 3 people, you and 2 others, the chance that neither of the other two shares your specific birthday is

$$\frac{364}{365} \cdot \frac{364}{365}.$$

However, the other two might have the same birthday, not equal to yours. The chance that all 3 people have different birthdays is

$$P(\text{None of the three shares the same birthday}) = \frac{364}{365} \cdot \frac{363}{365} = 0.992.$$

Answer: a. 0.00000751; b. 0.992.