Task 1.2

We are concerned about 3 cases:

case 1: 4 correct

$\binom{6}{4}$ = drawn 4 from 6 correct

$\binom{49-6}{2} = \binom{43}{2}$ = drawn 2 from 43 false

case 2: 5 correct

$\binom{6}{5}$ = drawn 5 from 6 correct

$\binom{49-6}{1} = \binom{43}{1}$ = drawn 1 from 43 false

case 3: 6 correct

$\binom{6}{0}$ = drawn 6 from 6 correct

$\binom{49-6}{0} = \binom{43}{0}$ = drawn no false

We calculate $\mathbb{P}(|G \cap D|)$

$$\frac{\overbrace{\binom{6}{4}\binom{43}{2}}^{\text{case 1}} + \overbrace{\binom{6}{5}\binom{43}{1}}^{\text{case 2}} + \overbrace{\binom{6}{6}\binom{43}{0}}^{\text{case 3}}}{\binom{49}{6}}$$

$$= \frac{15 \cdot 903 + 6 \cdot 43 + 1 \cdot 1}{13983816 \cdot 10^{7}} = 0.00099$$

Task 1.3

1 $1 \cdot \frac{5}{6} \cdot \frac{4}{6} \cdot \frac{3}{6} = \frac{5}{18}$

2 $\prod_{i=0}^{29} \frac{365-i}{365} = 0,2937$

3 $\binom{200}{10} = 2,2451 \cdot 10^{16}$

4 $\frac{\binom{29}{7}}{\binom{32}{10}} = \frac{3}{124}$

$3 \cdot \frac{3}{124} = \frac{9}{124}$