

## 4.5 De somregel en de complementregel

### Opgave 56:

- a.  $P(\text{som} = 3) = \frac{2}{36}$  (1-2 of 2-1)  
 $P(\text{som} = 4) = \frac{3}{36}$  (1-3 of 2-2 of 3-1)  
 $P(\text{som} = 3 \text{ of } \text{som} = 4) = \frac{5}{36}$  (1-2 of 2-1 of 1-3 of 2-2 of 3-1)
- b. ja
- c.  $P(\text{som} = 4) = \frac{3}{36}$  (1-3 of 2-2 of 3-1)  
 $P(\text{product} = 4) = \frac{3}{36}$  (1-4 of 2-2 of 4-1)  
 $P(\text{som} = 4 \text{ of } \text{product} = 4) = \frac{5}{36}$  (1-3 of 2-2 of 3-1 of 1-4 of 4-1)  
Dus niet gelijk

### Opgave 57:

De noemers zijn gelijknamig dus mag je eerst de tellers optellen en daarna pas delen door de noemer. Voordeel: minder werk.

### Opgave 58:

- a.  $\frac{\binom{4}{2} \cdot \binom{6}{1} + \binom{4}{3}}{\binom{10}{3}} = 0,333$
- b.  $P(\text{minder dan 2 groene}) = P(0 \text{ of } 1 \text{ groene}) = \frac{\binom{6}{3} + \binom{6}{2} \cdot \binom{4}{1}}{\binom{10}{3}} = 0,667$

### Opgave 59:

- a.  $P(0 \text{ of } 1 \text{ meisje}) = \frac{\binom{13}{4} + \binom{13}{3} \cdot \binom{15}{1}}{\binom{28}{4}} = 0,244$
- b.  $\frac{\binom{13}{1} \cdot \binom{15}{3} + \binom{13}{2} \cdot \binom{15}{2} \cdot \binom{13}{3} \cdot \binom{15}{1}}{\binom{28}{4}} = 0,898$

### Opgave 60:

- a.  $P(0 \text{ of } 1 \text{ prijs}) = \frac{\binom{76}{5} + \binom{4}{1} \cdot \binom{76}{4}}{\binom{80}{5}} = 0,982$
- b.  $1 \times 50 \text{ of } 2 \times 25$   
 $P = \frac{\binom{1}{1} \cdot \binom{76}{4} + \binom{3}{2} \cdot \binom{76}{3}}{\binom{80}{5}} = 0,062$

### Opgave 61:

- a.  $\frac{\binom{29}{9} \cdot \binom{24}{1} + \binom{29}{10}}{\binom{53}{10}} = 0,0134$

$$b. \frac{\binom{37}{10} + \binom{37}{9} \cdot \binom{16}{1} + \binom{37}{8} \cdot \binom{16}{2}}{\binom{53}{10}} = 0,3575$$

$$c. \frac{\binom{5}{2} \cdot \binom{48}{8}}{\binom{53}{10}} = 0,1935$$

### **Opgave 62:**

$$a. \frac{\binom{10}{4}}{\binom{22}{4}} = 0,0287$$

$$b. \frac{\binom{10}{3} \cdot \binom{12}{1} + \binom{10}{2} \cdot \binom{12}{2} + \binom{10}{1} \cdot \binom{12}{3} + \binom{12}{4}}{\binom{22}{4}} = 0,9713$$

### **Opgave 63:**

$$a. P(\text{minstens 1 prijs}) = 1 - P(\text{geen prijs}) = 1 - \frac{\binom{21}{3}}{\binom{25}{3}} = 0,4217$$

$$b. P(\text{niet 3 prijzen}) = 1 - P(3 prijzen) = 1 - \frac{\binom{4}{3}}{\binom{25}{3}} = 0,9983$$

$$c. \frac{\binom{4}{2} \cdot \binom{21}{1}}{\binom{25}{3}} = 0,0548$$

$$d. \frac{\binom{21}{3}}{\binom{25}{3}} = 0,5783$$

### **Opgave 64:**

$$a. P(\text{som} \neq 5) = 1 - P(\text{som} = 5) = 1 - \frac{6}{216} = \frac{210}{216} = 0,972$$

$$b. P(\text{som} < 17) = 1 - P(\text{som} \geq 17) = 1 - \frac{4}{216} = \frac{212}{216} = 0,981$$

### **Opgave 65:**

$$a. P(\text{minstens 1 groene}) = 1 - P(\text{geen groen}) = 1 - \frac{\binom{9}{3}}{\binom{12}{3}} = 0,618$$

$$b. P(\text{hoogstens 2 blauw}) = 1 - P(3 blauw) = 1 - \frac{\binom{5}{3}}{\binom{12}{3}} = 0,955$$

$$c. \frac{\binom{4}{1} \cdot \binom{3}{1} \cdot \binom{5}{1}}{\binom{12}{3}} = 0,273$$

$$d. \frac{\binom{4}{3} + \binom{3}{3} + \binom{5}{3}}{\binom{12}{3}} = 0,068$$

**Opgave 66:**

- het complement van geen groene is minstens 1 groene.
- het complement van gelijke kleuren is niet allemaal gelijke kleuren.
- het complement van meer dan 2 rood is hoogstens 2 rood.
- het complement van hoogstens 3 wit is minstens 4 wit.

**Opgave 67:**

$$a. P(\text{minstens 1 barst}) = 1 - P(\text{geen barst}) = 1 - \frac{\binom{46}{5}}{\binom{50}{5}} = 0,353$$

$$b. \frac{\binom{4}{4} \cdot \binom{46}{1}}{\binom{50}{5}} = 2,2 \cdot 10^{-5}$$

**Opgave 68:**

$$a. P(\text{minstens 2 bestuursleden}) = 1 - P(\text{hoogstens 1 bestuurslid}) \\ = 1 - \left( \frac{\binom{59}{5} + \binom{59}{4} \cdot \binom{6}{1}}{\binom{65}{5}} \right) = 0,0633$$

$$b. P(\text{minstens 1 keer supermarkt}) = 1 - P(\text{geen supermarkt}) \\ = 1 - \frac{\binom{57}{5}}{\binom{65}{5}} = 0,4931$$

- c. er zijn 8 leden van de supermarkt en nog 4 bestuursleden die geen lid zijn van de supermarkt.

$$\frac{\binom{53}{3}}{\binom{65}{5}} = 0,3474$$

**Opgave 69:**

$$a. P(0 \text{ of } 1 \text{ prijs}) = \frac{\binom{42}{4} + \binom{8}{1} \cdot \binom{42}{3}}{\binom{50}{4}} = 0,8848$$

$$b. 1 - P(\text{€75,-}) = 1 - \frac{\binom{3}{1} \binom{4}{1} \binom{42}{2} + \binom{4}{3} \binom{42}{1}}{\binom{50}{4}} = 0,9544$$

$$c. 1 - P(200 \text{ of meer}) = 1 - \frac{\binom{1}{1} \binom{3}{3} + \binom{1}{1} \binom{3}{2} \binom{4}{1} + \binom{1}{1} \binom{3}{2} \binom{42}{1}}{\binom{50}{4}} = 0,9994$$

$$d. 1 \times 100 \text{ of } 2 \times 50 \text{ of } 1 \times 50 + 2 \times 25 \text{ of } 4 \times 25 \\ \frac{\binom{1}{1} \binom{42}{3} + \binom{3}{2} \binom{42}{2} + \binom{3}{1} \binom{4}{2} \binom{42}{1} + \binom{4}{4}}{\binom{50}{4}} = 0,0644$$

**Opgave 70:**

$$a. \frac{\binom{20}{6} \cdot \binom{10}{2} + \binom{20}{7} \cdot \binom{10}{1} + \binom{20}{8}}{\binom{30}{8}} = 0,452$$

$$b. \quad P(\text{minder dan 7 jongens}) = 1 - P(\text{minstens 7 jongens}) = 1 - \frac{\binom{12}{7} \cdot \binom{18}{1} + \binom{12}{8}}{\binom{30}{8}} = 0,0025$$

$$c. \quad \frac{\binom{13}{3} \cdot \binom{17}{5}}{\binom{30}{4}} = 0,3024$$

### **Opgave 71:**

$$a. \quad \frac{\binom{9}{4} \cdot \binom{6}{4}}{\binom{15}{8}} = 0,2937$$

b. dus 8 linker handschoenen

$$\frac{\binom{9}{8}}{\binom{15}{8}} = 0,0014$$

$$c. \quad 1 - P(\text{geen of 1 paar}) = 1 - \frac{\binom{9}{8} + \binom{9}{7} \cdot \binom{6}{1}}{\binom{15}{8}} = 0,965$$

### **Opgave 72:**

$$a. \quad \frac{\binom{24}{5}}{\binom{30}{5}} = 0,2983$$

$$b. \quad P(\text{minstens 2 defect}) = 1 - P(\text{hoogstens 1 defect}) = 1 - \left( \frac{\binom{24}{5} + \binom{24}{4} \cdot \binom{6}{1}}{\binom{30}{5}} \right) = 0,7457$$

$$c. \quad \frac{\binom{24}{3} \cdot \binom{6}{2} + \binom{24}{4} \cdot \binom{6}{1} + \binom{24}{5}}{\binom{30}{5}} = 0,9587$$