

Hoofdstuk 4: Het kansbegrip.

4.1 Kansen

Opgave 1:

De kans dat ze 7 gooit is groter, want ze kan op zes manieren 7 gooien: 1-6, 2-5, 3-4, 4-3, 5-2, 6-1.

Ze kan op 4 manieren 9 gooien: 3-6, 4-5, 5-4, 6-3.

Opgave 2:

a.	$\frac{3}{36}$	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">6</td><td style="padding: 2px 5px;">7</td><td style="padding: 2px 5px;">8</td><td style="padding: 2px 5px;">9</td><td style="padding: 2px 5px;">10</td><td style="padding: 2px 5px;">11</td><td style="padding: 2px 5px;">12</td><td style="border-right: 1px solid black; padding: 2px 5px;">6</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">5</td><td style="padding: 2px 5px;">6</td><td style="padding: 2px 5px;">7</td><td style="padding: 2px 5px;">8</td><td style="padding: 2px 5px;">9</td><td style="padding: 2px 5px;">10</td><td style="padding: 2px 5px;">11</td><td style="border-right: 1px solid black; padding: 2px 5px;">5</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">4</td><td style="padding: 2px 5px;">5</td><td style="padding: 2px 5px;">6</td><td style="padding: 2px 5px;">7</td><td style="padding: 2px 5px;">8</td><td style="padding: 2px 5px;">9</td><td style="padding: 2px 5px;">10</td><td style="border-right: 1px solid black; padding: 2px 5px;">4</td></tr> </table>	6	7	8	9	10	11	12	6	5	6	7	8	9	10	11	5	4	5	6	7	8	9	10	4	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">6</td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">5</td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;">x</td><td style="padding: 2px 5px;"></td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">4</td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;"></td><td style="padding: 2px 5px;">x</td><td style="padding: 2px 5px;">x</td><td style="padding: 2px 5px;"></td></tr> </table>	6												5										x		4									x	x	
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Opgave 3:

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Opgave 4:

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Opgave 5:

- a. niet iedere sector is even groot
 b. $\frac{1}{6}$

Opgave 6:

totaal: $2^4 = 16$ mogelijkheden

- a. 4 keer kop of 4 keer munt dus: $\binom{4}{0} + \binom{4}{4} = 1 + 1 = 2$

$$P(4 \text{ keer hetzelfde}) = \frac{2}{16}$$

- b. 1 keer kop: $\binom{4}{1} = 4$

$$P(1 \text{ keer kop}) = \frac{4}{16}$$

- c. 2 keer munt of 3 keer munt of 4 keer munt, dus: $\binom{4}{2} + \binom{4}{3} + \binom{4}{4} = 6 + 4 + 1 = 11$

$$P(\text{meer dan 1 keer munt}) = \frac{11}{16}$$

Opgave 7:

totaal: $6^3 = 216$ mogelijkheden

- a. 1-1-3 kan op 3 manieren
 1-2-2 kan op 3 manieren
 dus $\frac{6}{216}$
- b. som = 3 : 1-1-1 kan op 1 manier
 som = 4 : 1-1-2 kan op 3 manieren
 som = 5 : kan op 6 manieren (zie opgave a)
 som = 6 : 1-1-4 kan op 3 manieren
 1-2-3 kan op 6 manieren
 2-2-2 kan op 1 manier
 dus $\frac{20}{216}$
- c. 3 keer 1, of 3 keer 2, of 3 keer 3, of 3 keer 4, of 3 keer 5, of 3 keer 6
 dus $\frac{6}{216}$

Opgave 8:

totaal: $6^4 = 1296$ mogelijkheden

- a. 6-6-6-4 kan op 4 manieren

6-6-5-5 kan op $\frac{4!}{2! \cdot 2!} = 6$ manieren

dus $\frac{10}{1296}$

- b. som = 4: 1-1-1-1 kan op 1 manier
 som = 5: 1-1-1-2 kan op 4 manieren
 som = 6: 1-1-1-3 kan op 4 manieren
 1-1-2-2 kan op 6 manieren

dus $\frac{15}{1296}$

- c. 1-1-1-4 kan op 4 manieren
 1-1-2-2 kan op 6 manieren

dus $\frac{10}{1296}$

Opgave 9:

totaal: $2^6 = 64$ mogelijkheden

a. $\binom{6}{5} = 6$ dus $\frac{6}{64}$

b. $\binom{6}{3} = 20$ dus $\frac{20}{64}$

c. 0 keer kop, of 1 keer kop, of 2 keer kop: $\binom{6}{0} + \binom{6}{1} + \binom{6}{2} = 1 + 6 + 15 = 22$

dus $\frac{22}{64}$

Opgave 10:

Totaal $4^3 = 64$ mogelijkheden.

- a. som = 12 4-4-4 kan op 1 manier
 som = 11 4-4-3 kan op 3 manieren
 som = 10 4-4-2 kan op 3 manieren
 4-3-3 kan op 3 manieren

dus totaal 10 manieren, dus $\frac{10}{64}$.

- b. 1-3-4 kan op $3! = 6$ manieren
 2-2-3 kan op 3 manieren

dus totaal 9 manieren, dus $\frac{9}{64}$.

Opgave 11:

a. $\frac{10}{36}$

300	x	x	x			
200				x	x	
200				x	x	
100						x
100						x
100						x
	100	100	100	200	200	300

b. $\frac{25}{36}$

300						
200	x	x	x	x	x	
200	x	x	x	x	x	
100	x	x	x	x	x	
100	x	x	x	x	x	
100	x	X	x	x	x	
	100	100	100	200	200	300

c. gemiddeld per klant: $\frac{100 + 100 + 100 + 200 + 200 + 300}{6} = \frac{1000}{6}$

in 12 dagen 24 klanten dus $24 \cdot \frac{1000}{6} = 4000$ euro

Opgave 12:

a. $\frac{1}{36}$

b. $\frac{12}{36}$

v	x	x				
c	x	x				
c	x	x				
500						
50				x	x	x
50				x	x	x
	50	50	500	c	c	v

c. $\frac{5}{36}$

v						
c						
c						
500	x	x				
50			x			
50			x			
	50	50	500	c	c	v

d. $\frac{15}{36}$

v			x	x	x	
c			x			x
c			x			x
500			x	x	x	x
50	x	x				
50	x	x				
	50	50	500	c	c	v