






Hoofdstuk 7 BREUKEN

7.0 INTRO

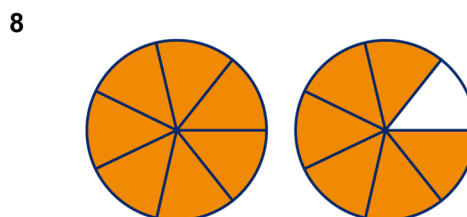
- 1 a ...
 b Nee
 c 2 kan maar op één manier: 
 5 kan op vier manieren: 
 Die met nummer 5 dus.
 d 3 kan op twee manieren: 
 11 kan op twee manieren: 
 Beide evenveel kans dus.
 e ...
- 2 a De oudste zoon krijgt 20 koeien, de daarop volgende zoon 15 en de jongste twee elk 12.
 b Ja, want $20 + 15 + 2 \cdot 12 = 59$.
 c $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{5} = \frac{59}{60}$ en niet 1.
- 3 a $3 \cdot 3 \cdot 3 = 27$ combinaties
 b 35% ; $\frac{4}{9}$; 1,9
 c $\frac{2}{11}$; $\frac{1}{3}$; 1,11

7.1 WAT ZIJN BREUKEN

- 4 a $\frac{10}{16} = \frac{5}{8}$ $\frac{4}{16} = \frac{1}{4}$
 $\frac{2}{6} = \frac{1}{3}$ $\frac{4}{12} = \frac{1}{3}$
 b $\frac{2}{5}$ deel
 c $\frac{1}{3}$ deel
- 5

4	8
5	3
7	1
- 6 $\frac{7}{11}$ zeven elfde
 $\frac{13}{7}$ dertien zevende
 $\frac{2}{4}$ twee vierde
 $\frac{1}{6}$ één zesde
- 7 a 
 b 10 stukjes gekleurd, één zestiende is $\frac{1}{16}$, $\frac{10}{16}$
 c ...

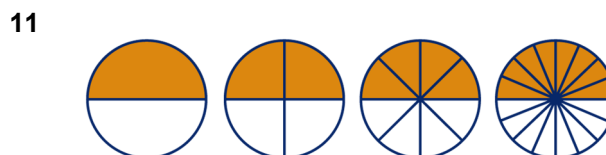
- d ... 5 de teller en 9 de noemer.
 ... a de teller en b de noemer.



- 9

80	22
12	8
490	2

- 10 6, dus $\frac{3}{8} = \frac{6}{16}$
 3, dus $\frac{1}{6} = \frac{3}{18}$
 4, dus $\frac{2}{4} = \frac{4}{8}$
 20, dus $\frac{2}{4} = \frac{20}{40}$
 1, dus $\frac{2}{4} = \frac{1}{2}$
 24, dus $\frac{3}{8} = \frac{9}{24}$
 36, dus $\frac{1}{6} = \frac{6}{36}$
 12, dus $\frac{2}{4} = \frac{6}{12}$
 20, dus $\frac{2}{4} = \frac{10}{20}$
 2, dus $\frac{2}{4} = \frac{1}{2}$



- 12 $\frac{1}{3}$, $\frac{1}{4}$, 2
- 13 $\frac{2}{4}$, $\frac{6}{15}$, $\frac{7}{21}$, $\frac{35}{100}$, $\frac{15}{8}$, $\frac{8}{24}$
- 14 Als je de teller én de noemer door een zelfde getal kunt delen.

15

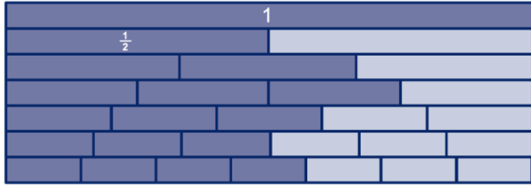
$\frac{1}{12}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$	$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$	$\frac{11}{12}$	$\frac{12}{12}$
x	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	x	$\frac{1}{2}$	x	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{5}{6}$	x	1

- 16

$\frac{2}{7}$	$\frac{1}{5}$
$\frac{3}{7}$	$\frac{1}{7}$
$\frac{4}{7}$	$\frac{1}{11}$
$\frac{p}{7}$	$\frac{1}{p}$

17 <, >, <

18 a

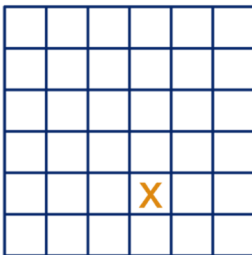


b < =
 < <

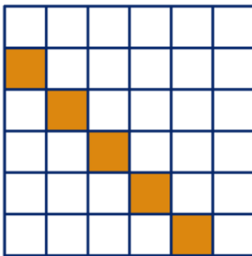
c $1, \frac{73}{70}$

d Als de teller kleiner is dan de noemer.

19 a



b



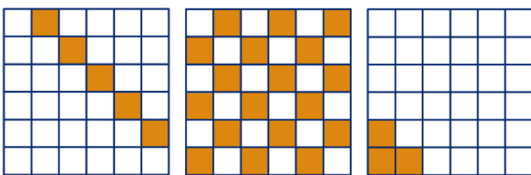
c Kans is $\frac{5}{36}$.

d

som van de ogen	2	3	4	5	6	7	8	9	10	11	12
kans	$\frac{1}{36}$	$\frac{1}{18}$	$\frac{1}{12}$	$\frac{1}{9}$	$\frac{5}{36}$	$\frac{1}{6}$	$\frac{5}{36}$	$\frac{1}{9}$	$\frac{1}{12}$	$\frac{1}{18}$	$\frac{1}{36}$

e nummer 7; ...

f



Som van de ogen is 8.

Kans is $\frac{5}{36}$.

Som van de ogen is even.

Kans is $\frac{18}{36} = \frac{1}{2}$.

Som van de ogen is kleiner dan 4.

Kans is $\frac{3}{36} = \frac{1}{12}$.

7.2 BREUKEN EN PROCENTEN

20 a $\frac{120}{800} = \frac{15}{100} = 15\%$

b $7 \cdot 4 = 28$ rotte appels,
 dus $400 - 28 = 372$ appels die niet rot zijn.

21 a 4 $\frac{3}{8}$

4 $\frac{17}{8}$

4 $\frac{t}{8}$

b 1 1

1 1

1 1

c $\frac{1}{7}$

d 13

22 a 1 1

2 2

5 5

t t

b $\frac{13}{7}, \frac{100}{7}$

c $\frac{13}{17}, \frac{100}{17}$

23 $\frac{100}{7}$ $\frac{7}{100}$

$\frac{100}{13}$ $\frac{13}{100}$

$\frac{100}{37}$ $\frac{37}{100}$

$\frac{100}{n}$ $\frac{t}{100}$

24 $\frac{25}{100} = 25\%$, $\frac{80}{100} = 80\%$

25 a 50 $16\frac{2}{3}$

$33\frac{1}{3}$ $14\frac{2}{7}$

25 $12\frac{1}{2}$

20 $11\frac{1}{9}$

b $\frac{300\%}{7} = 42\frac{6}{7}\%$

$\frac{500\%}{8} = 62\frac{1}{2}\%$

$\frac{700\%}{9} = 77\frac{7}{9}\%$

26 $\frac{28\frac{3}{4}}{100} = \frac{115}{400} = \frac{23}{80}$

$\frac{38\frac{8}{9}}{100} = \frac{350}{900} = \frac{7}{18}$

$\frac{58\frac{1}{3}}{100} = \frac{175}{300} = \frac{7}{12}$

27 a Afrika: $20\% = \frac{1}{5}$

Noord Amerika: $16\% = \frac{4}{25}$

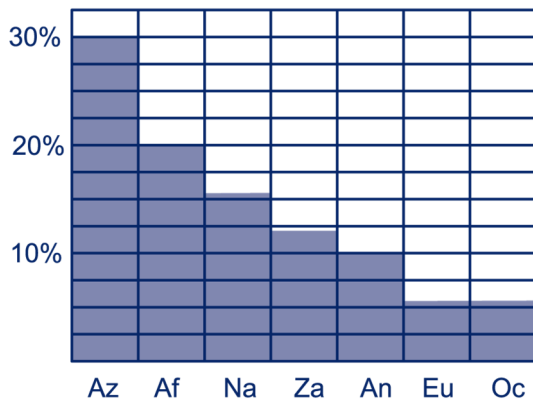
Zuid Amerika: $12\% = \frac{3}{25}$

Antarctica: $10\% = \frac{1}{10}$

Europa: $6\% = \frac{3}{50}$

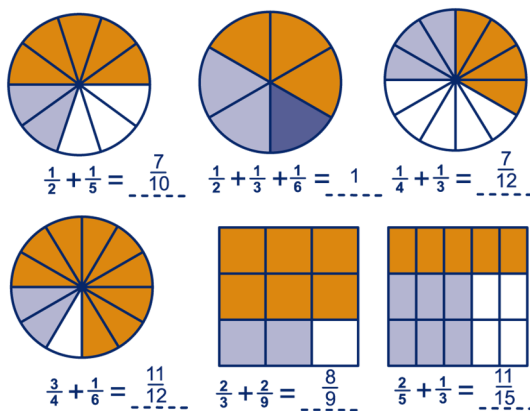
Oceanië: $6\% = \frac{3}{50}$

b



7.3 BREUKEN OPTELLEN EN AFTREKKEN

28



29 a $\frac{1}{2}$ is 5 tienden ; $\frac{1}{5}$ is 2 tienden

$$\frac{1}{2} + \frac{1}{5} = \frac{5}{10} + \frac{2}{10} = \frac{7}{10}$$

b In 14 stukjes.

c $\frac{1}{2} + \frac{1}{7} = \frac{7}{14} + \frac{2}{14} = \frac{9}{14}$

d In 6 stukjes.

30

$$\frac{2}{3} + \frac{1}{12} = \frac{8}{12} + \frac{1}{12} = \frac{9}{12} = \frac{3}{4}$$

$$\frac{3}{7} - \frac{1}{4} = \frac{12}{28} - \frac{7}{28} = \frac{5}{28}$$

$$\frac{1}{2} - \frac{1}{4} + \frac{1}{5} = \frac{10}{20} - \frac{5}{20} + \frac{4}{20} = \frac{9}{20}$$

$$\frac{2}{5} + \frac{1}{2} = \frac{4}{10} + \frac{5}{10} = \frac{9}{10}$$

$$\frac{4}{5} + \frac{1}{2} = \frac{8}{10} + \frac{5}{10} = \frac{13}{10} = 1\frac{3}{10}$$

$$\frac{p}{5} + \frac{1}{2} = \frac{2p}{10} + \frac{5}{10} = \frac{2p+5}{10}$$

$$\frac{1}{5} - \frac{1}{7} = \frac{7}{35} - \frac{5}{35} = \frac{2}{35}$$

$$\frac{4}{5} - \frac{3}{7} = \frac{28}{35} - \frac{15}{35} = \frac{13}{35}$$

$$\frac{3}{5} - \frac{q}{7} = \frac{21}{35} - \frac{5q}{35} = \frac{21-5q}{35}$$

31 Linkerkolom

$$\frac{a}{3} + \frac{a}{9} = \frac{3a}{9} + \frac{a}{9} = \frac{4a}{9}$$

$$\frac{5a}{6} + \frac{a}{9} = \frac{15a}{18} + \frac{2a}{18} = \frac{17a}{18}$$

$$\frac{a}{3} - \frac{2a}{9} = \frac{3a}{9} - \frac{2a}{9} = \frac{a}{9}$$

$$\frac{4a}{3} - \frac{5a}{9} = \frac{12a}{9} - \frac{5a}{9} = \frac{7a}{9}$$

Rechterkolom

$$\frac{3}{a} + \frac{9}{a} = \frac{12}{a}$$

$$\frac{3}{a} + \frac{2}{5} = \frac{15}{5a} + \frac{2a}{5a} = \frac{15+2a}{5a}$$

$$\frac{3a}{a} - \frac{1}{2} = 3 - \frac{1}{2} = 2\frac{1}{2}$$

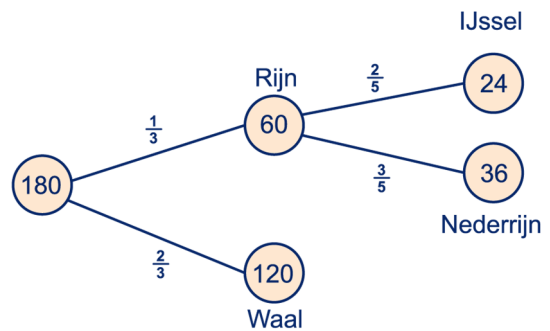
$$\frac{2}{7} - \frac{1}{a} = \frac{2a}{7a} - \frac{7}{7a} = \frac{2a-7}{7a}$$

32

$$\frac{3}{4} - \frac{4}{3} = \frac{3}{8} - \frac{5}{8} = \frac{8}{7} - \frac{3}{16}$$

7.4 DEEL VAN EEN DEEL

33 a

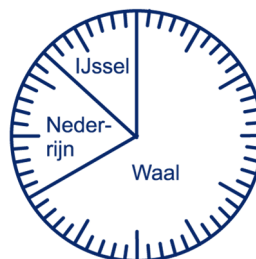


b $\frac{24}{180} = \frac{2}{15}$ deel door de IJssel

c $\frac{36}{180} = \frac{1}{5}$ deel door de Nederrijn

d $\frac{2}{3} + \frac{2}{15} + \frac{1}{5} = 1$ samen

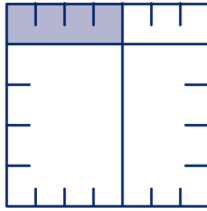
e



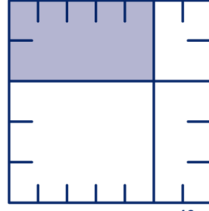
34 a $\frac{1}{35}$ deel gekleurd

b $\frac{6}{35}$ deel gekleurd

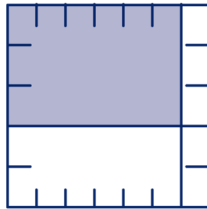
c



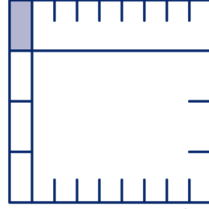
$$\frac{1}{5} \text{ deel van } \frac{4}{7} \text{ is } \frac{4}{35}$$



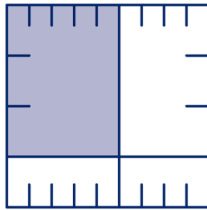
$$\frac{2}{5} \text{ deel van } \frac{5}{7} \text{ is } \frac{10}{35}$$



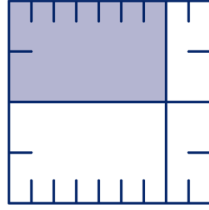
$$\frac{3}{5} \text{ deel van } \frac{6}{7} \text{ is } \frac{18}{35}$$



$$\frac{1}{4} \text{ deel van } \frac{1}{9} \text{ is } \frac{1}{36}$$



$$\frac{3}{4} \text{ deel van } \frac{5}{9} \text{ is } \frac{15}{36}$$



$$\frac{2}{4} \text{ deel van } \frac{7}{9} \text{ is } \frac{14}{36}$$

35 a De ene zijde in 5 stukjes en de andere zijde in 10 stukjes.

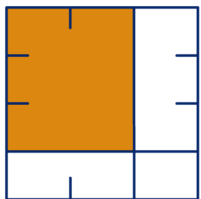
b $\frac{21}{50}$ $\frac{20}{81}$
 $\frac{39}{100}$ $\frac{ap}{bq}$

36 a $\frac{2}{5}$ bij $\frac{3}{4}$

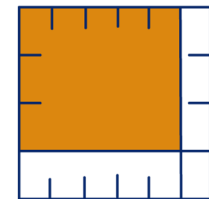
b 1^e manier: $\frac{2}{5} \cdot \frac{3}{4}$
 2^e manier: 6 hokjes gekleurd van elk $\frac{1}{20}$.
 Oppervlakte is $\frac{6}{20}$.

c $\frac{2}{5} \cdot \frac{3}{4} = \frac{6}{20}$

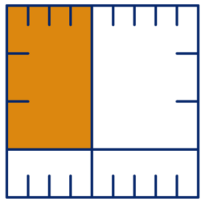
37



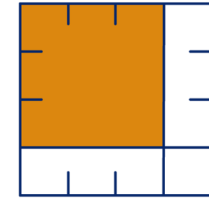
$$\frac{3}{4} \cdot \frac{2}{3} = \frac{1}{2}$$



$$\frac{3}{4} \cdot \frac{5}{6} = \frac{5}{8}$$



$$\frac{3}{4} \cdot \frac{4}{9} = \frac{1}{3}$$



$$\frac{3}{4} \cdot \frac{3}{4} = \frac{9}{16}$$

38 $\frac{3}{10}$ $\frac{6}{5} = 1\frac{1}{5}$
 $\frac{2}{10} = \frac{1}{5}$ $\frac{8}{5} = 1\frac{3}{5}$
 $\frac{a}{10}$ $\frac{2a}{5}$

39 $\frac{3p}{4q}$ $\frac{ap}{bq}$
 $\frac{3p}{4q}$ $\frac{ap}{bq}$

40 $\frac{5}{3}$ $\frac{15}{8}$
 $\frac{31}{6}$ $\frac{10}{3}$
 $\frac{17}{10}$ $\frac{3}{10}$

41 $\frac{3 \cdot 2 \cdot 1}{4 \cdot 5 \cdot 2} = \frac{6}{40} = \frac{3}{20}$
 $\frac{3}{7} \cdot \frac{a}{6} \cdot \frac{6}{10} = \frac{18a}{420} = \frac{3a}{70}$
 $\frac{a \cdot b \cdot c}{b \cdot c \cdot a} = \frac{abc}{abc} = 1$
 $\frac{1 \cdot 2 \cdot a \cdot 4b}{2 \cdot b \cdot 4 \cdot 5} = \frac{8ab}{40b} = \frac{a}{5}$
 $\frac{a}{5} \cdot \frac{a}{3} \cdot \frac{3}{2} = \frac{a \cdot a \cdot 3}{5 \cdot 3 \cdot 2} = \frac{3a^2}{30} = \frac{a^2}{10}$
 $\frac{3}{2} \cdot \frac{8}{3} \cdot \frac{41}{10} = \frac{3 \cdot 8 \cdot 41}{2 \cdot 3 \cdot 10} = \frac{984}{60} = 16\frac{2}{5}$
 $\frac{11}{4} \cdot \frac{2}{5} \cdot \frac{4}{3} = \frac{11 \cdot 2 \cdot 3}{4 \cdot 5 \cdot 3} = \frac{88}{60} = 1\frac{7}{15}$
 $\frac{15}{4} \cdot \frac{2a}{5} \cdot \frac{6}{b} = \frac{15 \cdot 2a \cdot 6}{4 \cdot 5 \cdot b} = \frac{180a}{20b} = \frac{9a}{b}$

7.5 DELEN DOOR EEN BREUK

42 a 10 potten, want $10 \cdot \frac{1}{2} = 5$ liter.

b

Aantal liters	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$1\frac{1}{4}$
Aantal potten	10	15	$7\frac{1}{2}$	4

c 9
8
2
 $\frac{1}{4}$

43 a 4 potten, $3\frac{1}{3} : \frac{5}{6} = 4$

b $2\frac{1}{10}$
 $11\frac{1}{5}$
 2
 $1\frac{7}{8}$

44 a 5, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{10}$, $\frac{2}{9}$

b 1
 c $1, \frac{1}{a}$

45 opgave 42c

$$4 \frac{1}{2} : \frac{1}{2} = \frac{9}{2} \cdot \frac{2}{1} = \frac{18}{2} = 9$$

$$2 : \frac{1}{4} = 2 \cdot \frac{4}{1} = \frac{8}{1} = 8$$

$$\frac{1}{2} : \frac{1}{4} = \frac{1}{2} \cdot \frac{4}{1} = \frac{4}{2} = 2$$

$$\frac{1}{2} : 2 = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

opgave 43b

$$1 \frac{3}{4} \cdot \frac{5}{6} = \frac{7}{4} \cdot \frac{5}{6} = \frac{35}{24} = 1 \frac{11}{24}$$

$$4 \frac{2}{3} \cdot \frac{5}{12} = \frac{14}{3} \cdot \frac{5}{12} = \frac{70}{12} = 5 \frac{5}{6}$$

$$\frac{5}{6} : \frac{5}{12} = \frac{5}{6} \cdot \frac{12}{5} = \frac{60}{30} = 2$$

$$11 \frac{1}{4} : 6 = \frac{45}{4} \cdot \frac{1}{6} = \frac{45}{24} = 1 \frac{7}{8}$$

46 $16 \cdot \frac{3}{2} = \frac{48}{2} = 24$

$28 \cdot \frac{3}{1} = \frac{84}{1} = 84$

$16 \cdot \frac{7}{4} = \frac{112}{4} = 28$

$28 \cdot \frac{3}{4} = \frac{84}{4} = 21$

$\frac{2}{3} \cdot \frac{7}{4} = \frac{14}{12} = 1 \frac{1}{6}$

$28 \cdot \frac{3}{8} = \frac{84}{8} = 10 \frac{1}{2}$

$\frac{4}{7} \cdot \frac{3}{2} = \frac{12}{14} = \frac{6}{7}$

$28 \cdot \frac{10}{3} = \frac{280}{3} = 93 \frac{1}{3}$

47 a $30 \cdot 2 = 60$

$30 \cdot 10 = 300$

$30 \cdot 4 = 120$

$30 \cdot 100 = 3000$

$30 \cdot 6 = 180$

$30 \cdot ? = ?$

b Dat bestaat niet.

SUPER OPGAVEN

13 a Janneke: $\frac{24}{24+27+9} = \frac{24}{60} = \frac{2}{5}$ deel

b Ton: $\frac{27}{60} = \frac{9}{20}$ deel

Gerd: $\frac{9}{60} = \frac{3}{20}$ deel

15 a Nee.

b Nee.

c Geen.

d 11 en 17 zijn priemgetallen (hebben maar twee delers)

e $\frac{1}{18}, \frac{5}{18}, \frac{7}{18}, \frac{11}{18}, \frac{13}{18}, \frac{17}{18}$

18 a $<, >, <, >$

b groter, kleiner

c $<, <$

19 a Uitkomsten 2 tot en met 12.

b

7	8	9	10	11	12
6	7	8	9	10	11
5	6	7	8	9	10
4	5	6	7	8	9
3	4	5	6	7	8
2	3	4	5	6	7

c Kans is $\frac{3}{36} = \frac{1}{12}$.

d

som van de ogen	2	3	4	5	6	7	8	9	10	11	12
kans	$\frac{1}{36}$	$\frac{1}{18}$	$\frac{1}{12}$	$\frac{1}{9}$	$\frac{5}{36}$	$\frac{1}{6}$	$\frac{5}{36}$	$\frac{1}{9}$	$\frac{1}{12}$	$\frac{1}{18}$	$\frac{1}{36}$

e Kans is $\frac{18}{36} = \frac{1}{2}$.

f De uitkomsten 3 tot en met 11.

g Ton kan twee keer dezelfde knikker pakken (dus twee keer hetzelfde getal) en Janneke niet.

h

7	8	9	10	11	
6	7	8	9		11
5	6	7		9	10
4	5		7	8	9
3		5	6	7	8
	3	4	5	6	7

i Kans is $\frac{2}{30} = \frac{1}{15}$.

j

som van de ogen	3	4	5	6	7	8	9	10	11
kans	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{2}{15}$	$\frac{2}{15}$	$\frac{1}{5}$	$\frac{2}{15}$	$\frac{2}{15}$	$\frac{1}{15}$	$\frac{1}{15}$

k Kans is $\frac{12}{30} = \frac{2}{5}$.

20 a $\frac{96}{240} = \frac{4}{10} = 40\%$

b 1% is 52:13 = 4 appels, dus 100% is 100 keer zo veel, dus 400 appels.

25 a $\frac{6}{32} = \frac{600\%}{32} = 18 \frac{3}{4}\%$ onvoldoende

b $\frac{21}{26} = \frac{2100\%}{26} = 80 \frac{10}{13}\%$ voldoende

c Percentage onvoldoende in 1HVy is

$$100\% - 80 \frac{10}{13}\% = 19 \frac{3}{13}\%, \text{ dus in 1HVx is het naar verhouding het beste gemaakt.}$$

d Bijvoorbeeld breuken gelijknamig maken

$$\frac{6}{32} = \frac{156}{832} \text{ en } \frac{5}{21} = \frac{160}{832}, \text{ dat betekent dat 156}$$

van de 832 leerlingen een onvoldoende heeft in 1HVx en in 1HVy 160 van de 832

leerlingen een onvoldoende heeft.

27 a $30\% \text{ van } 30\% = 0,3 \cdot 30\% = 9\%$

b $20\% \text{ van } 30\% = 0,2 \cdot 30\% = 6\%$

28

$\frac{1}{2}$

$\frac{1}{20}$

$\frac{1}{6}$

$\frac{1}{30}$

$\frac{1}{12}$

$\frac{1}{9900}$

29 a $\frac{1}{2} + \frac{1}{3} + \frac{1}{12} = \frac{6}{12} + \frac{4}{12} + \frac{1}{12} = \frac{11}{12}$. Klopt.

b $\frac{1}{4} + \frac{1}{8}$

$\frac{1}{2} + \frac{1}{5} + \frac{1}{10}$

$\frac{1}{3} + \frac{1}{9}$

$\frac{1}{2} + \frac{1}{5} + \frac{1}{30}$

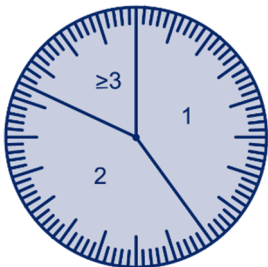
30 $\frac{8}{10} + \frac{5}{10} = \frac{13}{10} = 1\frac{3}{10}$
 $\frac{2p}{10} + \frac{5}{10} = \frac{2p+5}{10}$
 $\frac{2p}{10} + \frac{5p}{10} = \frac{7p}{10}$
 $\frac{7}{35} - \frac{5}{35} = \frac{2}{35}$
 $\frac{7}{35} - \frac{5q}{35} = \frac{7-5q}{35}$
 $\frac{7q}{35} - \frac{5q}{35} = \frac{2q}{35}$

32 a $\frac{1}{8} - \frac{1}{32} = \frac{4}{32} - \frac{1}{32} = \frac{3}{32}$
 b $\frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{256} = \frac{64}{256} + \frac{16}{256} + \frac{4}{256} + \frac{1}{256} = \frac{85}{256}$
 $\frac{1}{2} + \frac{1}{8} + \frac{1}{32} = \frac{16}{32} + \frac{4}{32} + \frac{1}{32} = \frac{21}{32}$

33 a $1000 + 1050 + 450 = 2500$ duizend

b $\frac{1000}{2500} = \frac{2}{5}$, $\frac{1050}{2500} = \frac{21}{50}$, $\frac{450}{2500} = \frac{9}{50}$

c



- d 26% van 1.050.000 = $26 \cdot 10.500 = 273.000$
 e 50% van 1.050.000 = 525.000
 f $1.050.000 - 273.000 - 525.000 = 252.000$
 g 18% van 70% = $0,18 \cdot 70\% = 12,6\%$

35 a $\frac{7}{12}$ van 24 = 14 cent

b $\frac{3}{5}$ van $\frac{5}{12} = \frac{15}{60} = \frac{1}{4}$ deel

$\frac{1}{4}$ van 24 = 6 cent

c $\frac{2}{5}$ van $\frac{5}{12} = \frac{10}{60} = \frac{1}{6}$ deel

$\frac{1}{6}$ van 24 = 4 cent

- d $4 + 14 + 6 + 0 = 24$ cent. Niets gewonnen, maar ook niets verloren.
 e $14 + 3 \cdot 4 = 26$ cent. Heeft 2 cent gewonnen.
 f Als je wint verdien je 8 cent, als je derde wordt verlies je 2 cent. Als je één keer wint en vier keer verliest speel je quitte. Dus Sophie moet vier keer zo vaak derde geworden zijn dan dat ze gewonnen heeft.
 g Als je tweede wordt verdien je niets en als je derde wordt verlies je 2 cent. Dus als je alleen maar tweede en derde wordt kan je nooit quitte spelen, alleen maar verliezen.

37 a $\frac{2}{9} \cdot \frac{6}{7} = \frac{12}{63} = \frac{4}{21}$ deel

b $\frac{6}{7} - \frac{4}{21} = \frac{18}{21} - \frac{4}{21} = \frac{14}{21} = \frac{2}{3}$ deel over

c $\frac{3}{8} \cdot \frac{2}{3} = \frac{6}{24} = \frac{1}{4}$ deel

d Vader: $\frac{1}{7} = \frac{12}{84}$ deel

Gerd: $\frac{4}{21} = \frac{16}{84}$ deel

Ton: $\frac{1}{4} = \frac{21}{84}$ deel

Dus Ton heeft het meest op.

7.7 EXTRA OPGAVEN

1 $\frac{6}{16} = \frac{3}{8}$ $2 + \frac{4}{6} = 2\frac{4}{6} = 2\frac{2}{3}$

2 $\frac{2 \cdot 3}{7} = \frac{6}{7}$ $2\frac{3}{7}$
 $\frac{a \cdot 3}{7} = \frac{3a}{7}$ $\frac{7a}{7} + \frac{3}{7} = \frac{7a+3}{7}$
 $\frac{a \cdot b}{7} = \frac{ab}{7}$ $\frac{7a}{7} + \frac{b}{7} = \frac{7a+b}{7}$

$\frac{4 \cdot 2}{5 \cdot 3} = \frac{8}{15}$ $\frac{a \cdot b}{5 \cdot 3} = \frac{ab}{15}$
 $\frac{12}{15} + \frac{10}{15} = \frac{22}{15} = 1\frac{7}{15}$ $\frac{3a}{15} + \frac{5b}{15} = \frac{3a+5b}{15}$
 $\frac{12}{15} - \frac{10}{15} = \frac{2}{15}$ $\frac{3a}{15} - \frac{5b}{15} = \frac{3a-5b}{15}$

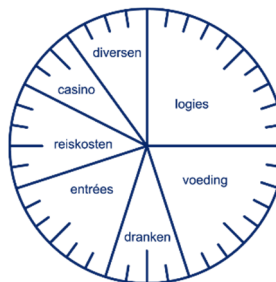
$\frac{t \cdot t}{3 \cdot 6} = \frac{t^2}{18}$ $\frac{s \cdot s}{2 \cdot 3} = \frac{s^2}{6}$
 $\frac{2t}{6} + \frac{t}{6} = \frac{3t}{6} = \frac{t}{2}$ $\frac{3s}{6} + \frac{2s}{6} = \frac{5s}{6}$
 $\frac{2t}{6} - \frac{t}{6} = \frac{t}{6}$ $\frac{3s}{6} - \frac{2s}{6} = \frac{s}{6}$

$\frac{p \cdot q}{5 \cdot 7} = \frac{pq}{35}$ $\frac{5 \cdot 1}{r \cdot 2} = \frac{5}{2r}$
 $\frac{7p}{35} + \frac{5q}{35} = \frac{7p+5q}{35}$ $\frac{10}{2r} + \frac{r}{2r} = \frac{10+r}{2r}$
 $\frac{7p}{35} - \frac{5q}{35} = \frac{7p-5q}{35}$ $\frac{10}{2r} - \frac{r}{2r} = \frac{10-r}{2r}$

$\frac{a \cdot b \cdot c}{3 \cdot 4 \cdot 5} = \frac{abc}{60}$ $\frac{2 \cdot 3}{x \cdot y} = \frac{6}{xy}$
 $\frac{20a}{60} + \frac{15b}{60} + \frac{12c}{60} = \frac{20a+15b+12c}{60}$ $\frac{2y}{xy} + \frac{3x}{xy} = \frac{2y+3x}{xy}$
 $\frac{ab}{12} + \frac{c}{5} = \frac{5ab}{60} + \frac{12c}{60} = \frac{5ab+12c}{60}$ $\frac{2y}{xy} - \frac{3x}{xy} = \frac{2y-3x}{xy}$
 $\frac{20a}{60} - \frac{15b}{60} + \frac{12c}{60} = \frac{20a-15b+12c}{60}$
 $\frac{a}{3} - \frac{bc}{20} = \frac{20a}{60} - \frac{3bc}{60} = \frac{20a-3bc}{60}$

3 a $\frac{12}{100} = \frac{3}{25}$ $\frac{82\frac{1}{2}}{100} = \frac{165}{200} = \frac{33}{40}$
 b $\frac{300\%}{8} = 37\frac{1}{2}\%$ $\frac{500\%}{13} = 38\frac{6}{13}\%$

4 a



b $\frac{1}{4} + \frac{1}{5} = \frac{5}{20} + \frac{4}{20} = \frac{9}{20}$ deel, $\frac{9}{20} = \frac{45}{100} = 45\%$

c $\frac{1}{10} + \frac{3}{40} + \frac{3}{20} = \frac{4}{40} + \frac{3}{40} + \frac{6}{40} = \frac{13}{40}$ deel ,

$\frac{13}{40} = \frac{1300\%}{40} = 32\frac{1}{2}\%$

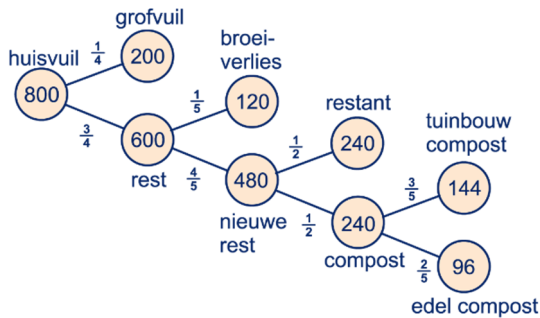
d $\frac{13}{40}$ deel is 260 euro

$\frac{1}{40}$ deel is 20 euro

$\frac{40}{40}$ deel is 800 euro

Ze is met 800 euro op vakantie gegaan.

5 a



b 1^e manier:

compost: 240 duizend ton
huisvuil: 800 duizend ton

het deel is $\frac{240}{800} = \frac{3}{10}$

2^e manier:

$\frac{1}{2}$ deel van $\frac{4}{5}$ deel van $\frac{3}{4}$ deel.

$\frac{1}{2} \cdot \frac{4}{5} \cdot \frac{3}{4} = \frac{12}{40} = \frac{3}{10}$

c $\frac{96}{800} = \frac{3}{25}$

$\frac{2}{5} \cdot \frac{1}{2} \cdot \frac{4}{5} \cdot \frac{3}{4} = \frac{24}{200} = \frac{3}{25}$

6 a $\frac{4+5+4}{3 \cdot 3 \cdot 3} = \frac{13}{27}$ deel

b $\frac{12+13+12+13+12}{5 \cdot 5 \cdot 5} = \frac{62}{125}$ deel

7 a

5	6	7	8
4	5	6	7
3	4	5	6
2	3	4	5

b

som van de ogen	2	3	4	5	6	7	8
kans	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{16}$

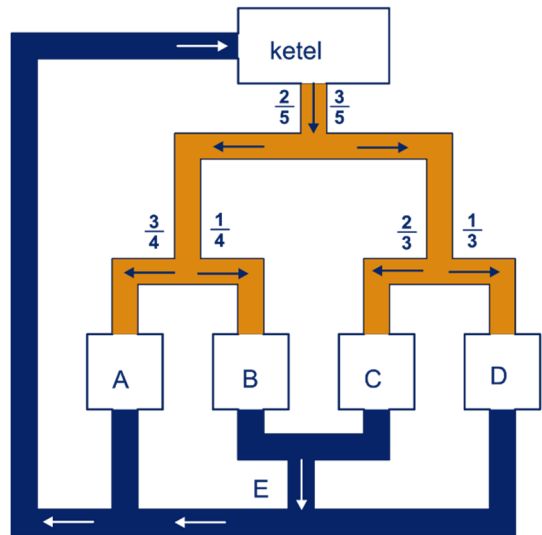
c De kans is $\frac{10}{16} = \frac{5}{8}$.

8 Deel donker blauw: $\frac{1}{4}, \frac{5}{16}, \frac{21}{64}$

Deel oker: $\frac{1}{4}, \frac{5}{16}, \frac{21}{64}$

Deel licht blauw: $\frac{1}{4}, \frac{5}{16}, \frac{21}{64}$

9 a



b Door A: $\frac{2}{5} \cdot \frac{3}{4} = \frac{6}{20} = \frac{3}{10}$ deel

Door B: $\frac{2}{5} \cdot \frac{1}{4} = \frac{2}{20} = \frac{1}{10}$ deel

Door C: $\frac{3}{5} \cdot \frac{2}{3} = \frac{6}{15} = \frac{2}{5}$ deel

Door D: $\frac{3}{5} \cdot \frac{1}{3} = \frac{3}{15} = \frac{1}{5}$ deel

c $\frac{3}{10} + \frac{1}{10} + \frac{2}{5} + \frac{1}{5} = \frac{4}{10} + \frac{3}{5} = \frac{2}{5} + \frac{3}{5} = 1$

d Buis E: $\frac{1}{10} + \frac{2}{5} = \frac{1}{10} + \frac{4}{10} = \frac{5}{10} = \frac{1}{2}$ deel

Buis F: $\frac{1}{10} + \frac{2}{5} + \frac{1}{5} = \frac{1}{10} + \frac{4}{10} + \frac{2}{10} = \frac{7}{10}$ deel

Buis G: $\frac{3}{10} + \frac{1}{10} + \frac{2}{5} + \frac{1}{5} = \frac{4}{10} + \frac{3}{5} = \frac{2}{5} + \frac{3}{5} = 1$ deel

10 15 14 ; 42 3a ; 6a

55 20 ; 220 3a ; 9a

625 9 ; 45 a ; 15a

11 3 · 6 = 18

$\frac{4}{11} \cdot \frac{13}{6} = \frac{4}{11} \cdot \frac{6}{13} = \frac{24}{143}$

$4 \cdot \frac{4}{3} = \frac{16}{3} = 5\frac{1}{3}$

$\frac{17}{5} \cdot \frac{7}{4} = \frac{17}{5} \cdot \frac{4}{7} = \frac{68}{35} = 1\frac{33}{35}$

$\frac{2}{9} \cdot \frac{5}{3} = \frac{10}{27}$

$\frac{23}{3} \cdot \frac{38}{10} = \frac{23}{3} \cdot \frac{19}{5} = \frac{230}{15} = \frac{230}{15} = 2\frac{1}{3}$

$\frac{13}{4} \cdot \frac{7}{3} = \frac{91}{12} = 7\frac{7}{12}$

$\frac{6}{10} \cdot \frac{13}{3} = \frac{6}{10} \cdot \frac{13}{3} = \frac{18}{30} = \frac{9}{15} = \frac{3}{5}$