

4. Het vereenvoudigen van breuken

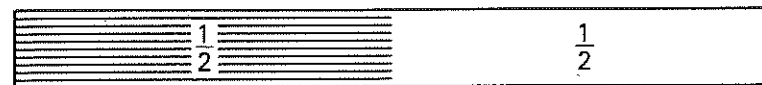
Je ziet hier 2 dezelfde rechthoeken.

Van de eerste rechthoek is de helft gestreept en dat noemen we $\frac{1}{2}$ deel.

Van de tweede rechthoek zijn 2 van de 4 gelijke delen gestreept, dus $\frac{2}{4}$ deel.

Als je goed kijkt dan zie je $\frac{2}{4} = \frac{1}{2}$.

► 4.1

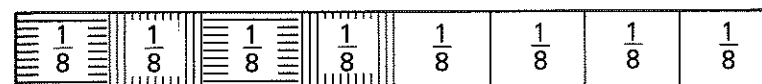


$$\frac{2}{4} = \frac{1}{2}$$

Je ziet hier weer 2 dezelfde rechthoeken waarvan bij de eerste de helft gestreept is, dus $\frac{1}{2}$ deel.

Van de tweede rechthoek zijn 4 van de 8 gelijke delen gestreept, dus $\frac{4}{8}$ deel.

Je ziet weer $\frac{4}{8} = \frac{1}{2}$.



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

We zien dus dat een breuk in bepaalde gevallen kan worden vereenvoudigd.

We bereiken dit door teller en noemer door hetzelfde getal te delen.

$$\begin{array}{l} 2 \rightarrow \text{teller delen door } 2 \rightarrow 1 \\ 4 \rightarrow \text{noemer delen door } 2 \rightarrow 2 \end{array}$$

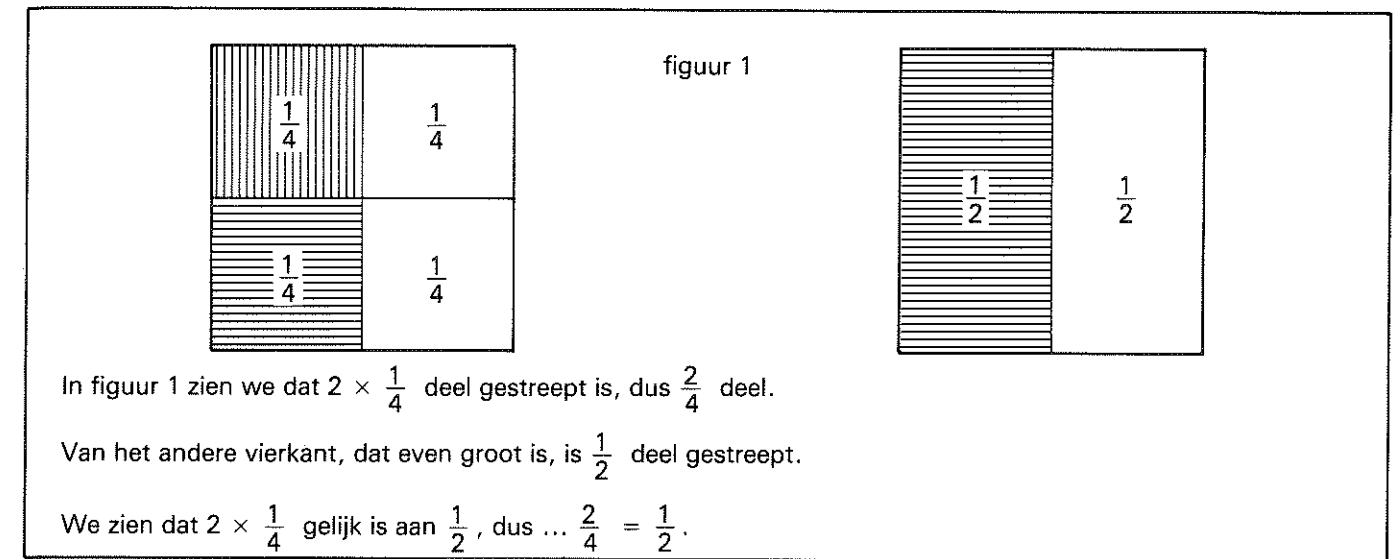
$$\begin{array}{l} 2 \rightarrow \text{teller delen door } 2 \rightarrow 1 \\ 6 \rightarrow \text{noemer delen door } 2 \rightarrow 3 \end{array}$$

$$\begin{array}{l} 4 \rightarrow \text{teller delen door } 4 \rightarrow 1 \\ 8 \rightarrow \text{noemer delen door } 4 \rightarrow 2 \end{array}$$

$$\begin{array}{l} 3 \rightarrow \text{teller delen door } 3 \rightarrow 1 \\ 12 \rightarrow \text{noemer delen door } 3 \rightarrow 4 \end{array}$$

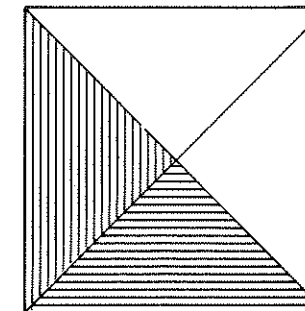
► 4.2

Bekijk de volgende figuren goed, dan zie je waarom breuken vereenvoudigd kunnen worden. Controleer zelf of bij elke vereenvoudiging teller en noemer door hetzelfde getal gedeeld zijn.

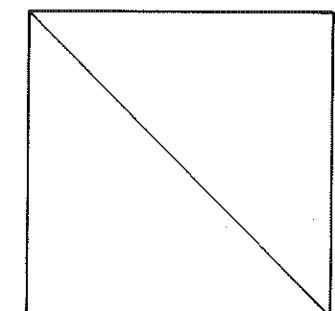


Kleur van de figuren 2 t/m 4 het gevraagde deel en vereenvoudig de breuk steeds tot de kleinste vorm.

figuur 2



$$\frac{2}{4} = \frac{\quad}{\quad}$$



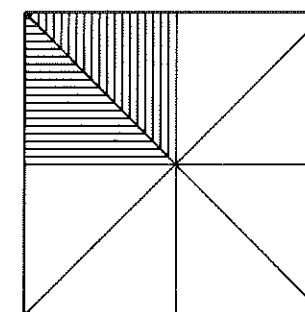
figuur 3



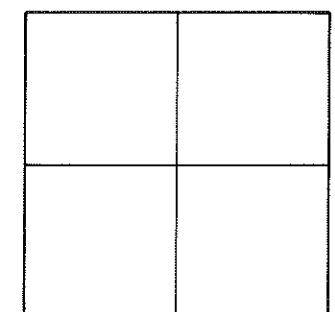
$$\frac{2}{4} = \frac{\quad}{\quad}$$



figuur 4

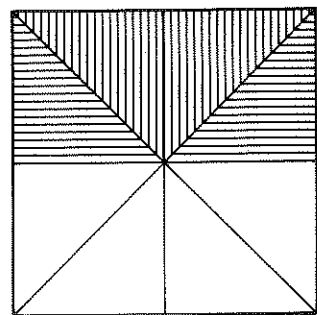


$$\frac{2}{8} = \frac{\quad}{\quad}$$

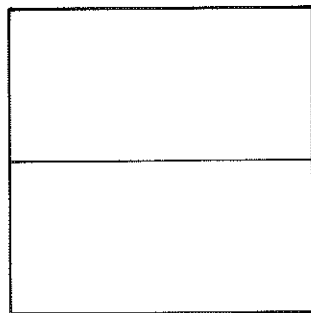


Kleur van de figuren 5 t/m 10 het gevraagde deel en vereenvoudig de breuk steeds tot de kleinste vorm.

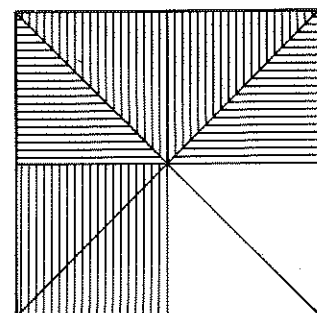
figuur 5



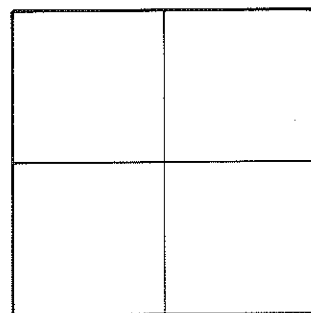
$$\frac{4}{8} = \frac{\quad}{\quad}$$



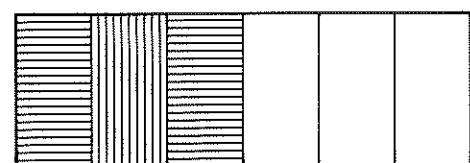
figuur 6



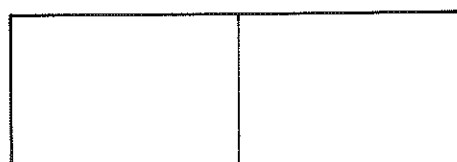
$$\frac{6}{8} = \frac{\quad}{\quad}$$



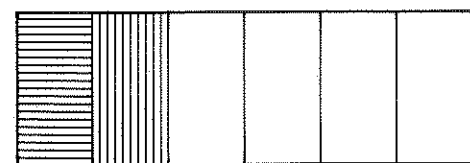
figuur 7



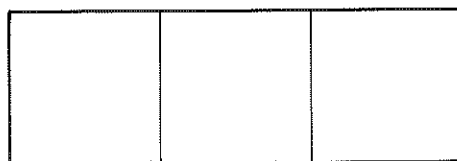
$$\frac{3}{6} = \frac{\quad}{\quad}$$



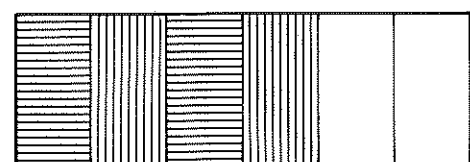
figuur 8



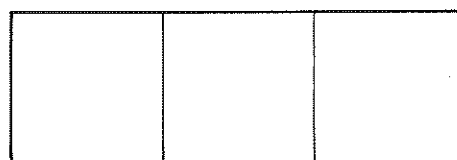
$$\frac{2}{6} = \frac{\quad}{\quad}$$



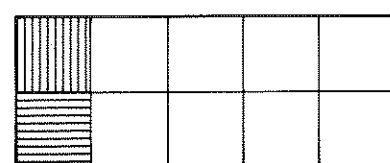
figuur 9



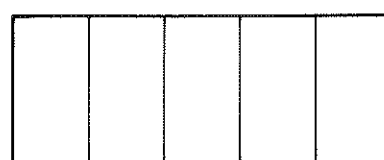
$$\frac{4}{6} = \frac{\quad}{\quad}$$



figuur 10

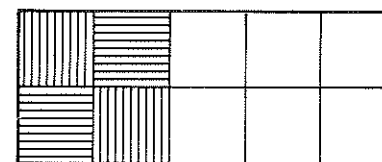


$$\frac{2}{10} = \frac{\quad}{\quad}$$

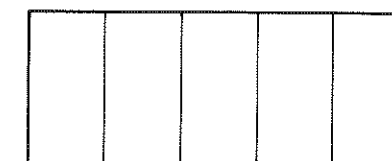


Kleur van de figuren 11 t/m 16 het gevraagde deel en vereenvoudig de breuk steeds tot de kleinste vorm.

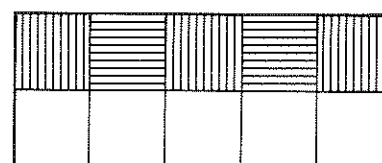
figuur 11



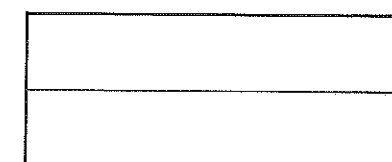
$$\frac{4}{10} = \frac{\quad}{\quad}$$



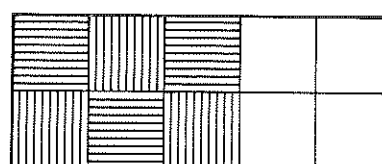
figuur 12



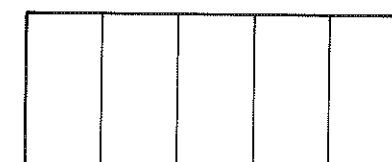
$$\frac{5}{10} = \frac{\quad}{\quad}$$



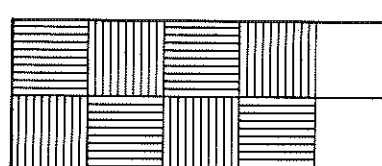
figuur 13



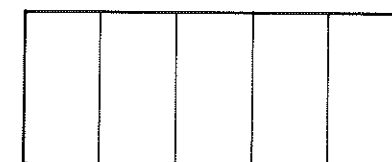
$$\frac{6}{10} = \frac{\quad}{\quad}$$



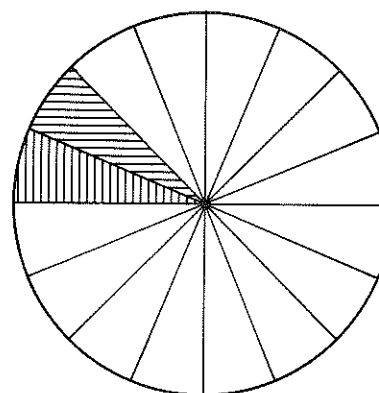
figuur 14



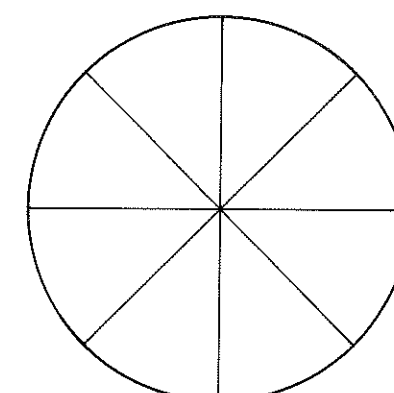
$$\frac{8}{10} = \frac{\quad}{\quad}$$



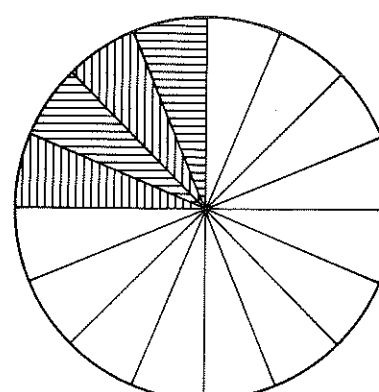
figuur 15



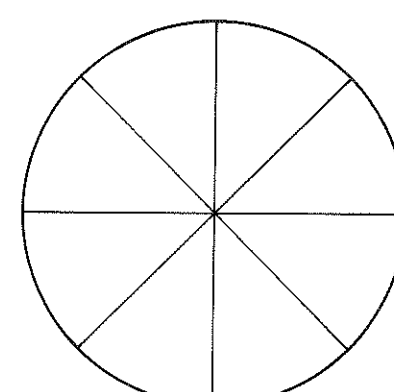
$$\frac{2}{16} = \frac{\quad}{\quad}$$



figuur 16

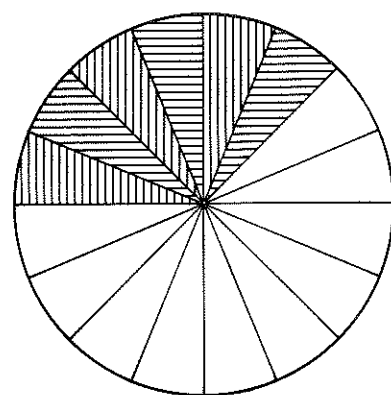


$$\frac{4}{16} = \frac{\quad}{\quad}$$

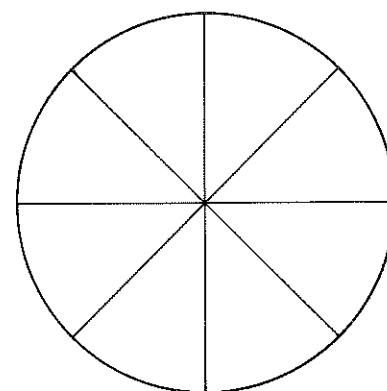


Kleur van de figuren 17 t/m 19 het gevraagde deel en vereenvoudig de breuk steeds tot de kleinste vorm.

figuur 17



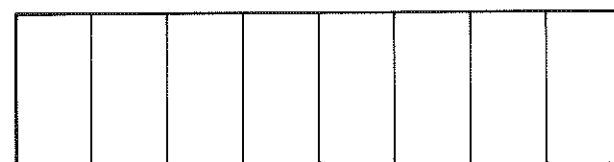
$$\frac{6}{16} = \frac{\quad}{\quad}$$



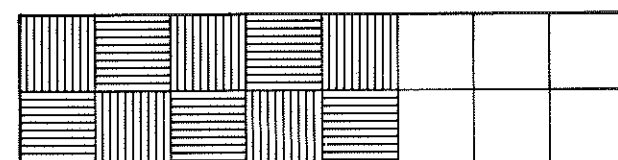
figuur 18



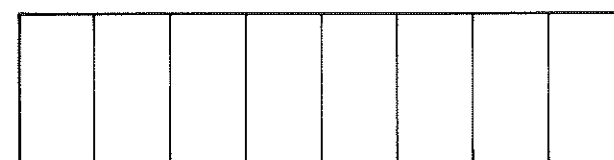
$$\frac{8}{16} = \frac{\quad}{\quad}$$



figuur 19

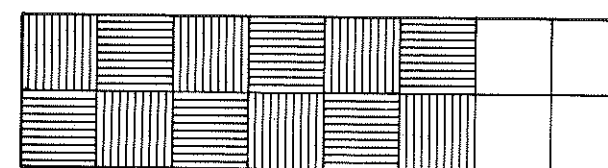


$$\frac{10}{16} = \frac{\quad}{\quad}$$

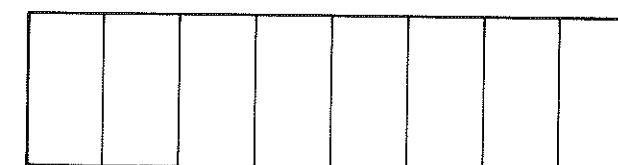


Kleur van de figuren 20 en 21 het gevraagde deel en vereenvoudig de breuk steeds tot de kleinste vorm.

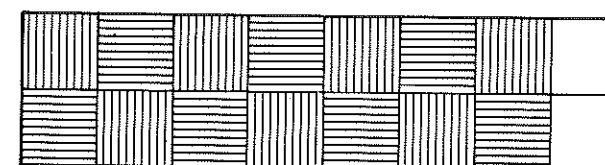
figuur 20



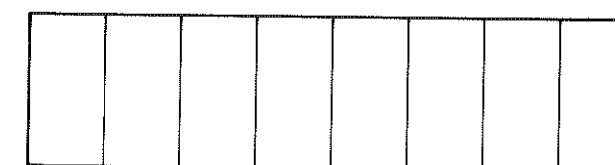
$$\frac{12}{16} = \frac{\quad}{\quad}$$



figuur 21



$$\frac{14}{16} = \frac{\quad}{\quad}$$



►4.3

In ►4.2 hebben we met behulp van figuren breuken vereenvoudigd.
Omdat we geleerd hebben dat we een breuk kunnen vereenvoudigen door teller en noemer door hetzelfde getal te delen, gaan we het nu zonder figuren proberen.

$$\frac{3}{9} ; \text{ teller en noemer delen door } 3 \dots \frac{3}{9} = \frac{1}{3}$$

$$\frac{8}{12} ; \text{ teller en noemer delen door } 4 \dots \frac{8}{12} = \frac{2}{3}$$

$$\frac{3}{21} ; \text{ teller en noemer delen door } 3 \dots \frac{3}{21} = \frac{1}{7}$$

►4.4

Vereenvoudig nu de volgende breuken.

$$\frac{2}{4} ; \text{ teller en noemer delen door } \dots \text{ dus } \frac{2}{4} = -$$

$$\frac{3}{6} ; \text{ teller en noemer delen door } \dots \text{ dus } \frac{3}{6} = -$$

$$\frac{4}{6} ; \text{ teller en noemer delen door } \dots \text{ dus } \frac{4}{6} = -$$

$$\frac{3}{9} ; \text{ teller en noemer delen door } \dots \text{ dus } \frac{3}{9} = -$$

$$\frac{4}{12} ; \text{ teller en noemer delen door } \dots \text{ dus } \frac{4}{12} = -$$

$$\frac{6}{9} = - \quad \frac{6}{8} = - \quad \frac{8}{10} = - \quad \frac{2}{12} = -$$

$$\frac{3}{9} = - \quad \frac{4}{8} = - \quad \frac{5}{10} = - \quad \frac{7}{14} = -$$

$$\frac{2}{8} = - \quad \frac{3}{6} = - \quad \frac{6}{10} = - \quad \frac{2}{14} = -$$

$$\frac{2}{12} = - \quad \frac{2}{10} = - \quad \frac{8}{12} = - \quad \frac{8}{14} = -$$

$$\frac{2}{6} = - \quad \frac{4}{10} = - \quad \frac{10}{12} = - \quad \frac{4}{14} = -$$

$$\frac{3}{15} = - \quad \frac{2}{16} = - \quad \frac{2}{18} = - \quad \frac{2}{20} = -$$

$$\frac{5}{15} = - \quad \frac{4}{16} = - \quad \frac{4}{18} = - \quad \frac{5}{20} = -$$

$$\frac{9}{15} = - \quad \frac{6}{16} = - \quad \frac{9}{18} = - \quad \frac{8}{20} = -$$

$$\frac{12}{15} = - \quad \frac{8}{16} = - \quad \frac{6}{18} = - \quad \frac{10}{20} = -$$

$$\frac{6}{15} = - \quad \frac{12}{16} = - \quad \frac{3}{18} = - \quad \frac{18}{20} = -$$

$$\frac{7}{21} = - \quad \frac{3}{24} = - \quad \frac{14}{21} = - \quad \frac{3}{27} = -$$

$$\frac{3}{21} = - \quad \frac{3}{30} = - \quad \frac{6}{30} = - \quad \frac{4}{40} = -$$

$$\frac{4}{24} = - \quad \frac{6}{24} = - \quad \frac{2}{26} = - \quad \frac{3}{48} = -$$

$$\frac{2}{22} = - \quad \frac{8}{24} = - \quad \frac{15}{30} = - \quad \frac{4}{28} = -$$

$$\frac{2}{24} = - \quad \frac{12}{24} = - \quad \frac{4}{32} = - \quad \frac{5}{50} = -$$

In ►1.1 hebben we geleerd dat wanneer teller en noemer gelijk zijn de breuk één hele is.

$$\frac{2}{2} = 1 \quad \frac{5}{5} = 1 \quad \frac{10}{10} = 1 \quad \frac{12}{12} = 1$$

In de onderstaande voorbeelden hebben we eerst de helen eruit gehaald en daarna de breuken vereenvoudigd tot de kleinste vorm.

$$\frac{4}{3} = \frac{3+1}{3} = \frac{3}{3} + \frac{1}{3} = 1\frac{1}{3}$$

$$\frac{6}{4} = \frac{4+2}{4} = \frac{4}{4} + \frac{2}{4} = 1\frac{2}{4} = 1\frac{1}{2}$$

$$\frac{6}{5} = \frac{5+1}{5} = \frac{5}{5} + \frac{1}{5} = 1\frac{1}{5}$$

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

Vereenvoudig de volgende breuken. Haal eerst de helen eruit en vereenvoudig dan tot de kleinste vorm.

$\frac{3}{2} =$	$\frac{6}{5} =$	$\frac{8}{7} =$	$\frac{11}{8} =$
$\frac{4}{3} =$	$\frac{8}{5} =$	$\frac{10}{7} =$	$\frac{10}{9} =$
$\frac{5}{3} =$	$\frac{7}{5} =$	$\frac{9}{7} =$	$\frac{15}{9} =$
$\frac{5}{4} =$	$\frac{9}{5} =$	$\frac{9}{8} =$	$\frac{11}{10} =$
$\frac{6}{4} =$	$\frac{7}{6} =$	$\frac{12}{8} =$	$\frac{15}{10} =$
$\frac{13}{10} =$	$\frac{15}{14} =$	$\frac{21}{20} =$	$\frac{52}{50} =$
$\frac{13}{12} =$	$\frac{16}{15} =$	$\frac{20}{19} =$	$\frac{26}{25} =$
$\frac{16}{14} =$	$\frac{22}{20} =$	$\frac{31}{30} =$	$\frac{50}{40} =$
$\frac{18}{10} =$	$\frac{18}{13} =$	$\frac{36}{35} =$	$\frac{75}{50} =$
$\frac{16}{12} =$	$\frac{17}{16} =$	$\frac{14}{13} =$	$\frac{76}{75} =$
$\frac{5}{2} =$	$\frac{17}{7} =$	$\frac{21}{10} =$	$\frac{9}{3} =$
$\frac{6}{3} =$	$\frac{17}{8} =$	$\frac{25}{12} =$	$\frac{15}{4} =$
$\frac{9}{4} =$	$\frac{24}{8} =$	$\frac{22}{11} =$	$\frac{25}{5} =$
$\frac{10}{5} =$	$\frac{18}{9} =$	$\frac{31}{15} =$	$\frac{20}{6} =$
$\frac{13}{6} =$	$\frac{14}{7} =$	$\frac{41}{20} =$	$\frac{16}{4} =$

In ► 4.4 hebben we geleerd breuken te vereenvoudigen.

$\frac{2}{4} = \frac{1}{2}$	$\frac{3}{6} = \frac{1}{2}$	$\frac{3}{9} = \frac{1}{3}$	$\frac{4}{12} = \frac{1}{3}$
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Daarna hebben we uit de breuken eerst de helen gehaald en de breuken vereenvoudigd tot de kleinste vorm.

$\frac{8}{6} = \frac{6+2}{6} = 1\frac{2}{6} = 1\frac{1}{3}$
$\frac{18}{12} = \frac{12+6}{12} = 1\frac{6}{12} = 1\frac{1}{2}$

Nu gaan we het omgekeerde doen. De HELEN verdelen in BREUKEN.

$1 = \frac{3}{3}$	$1 = \frac{5}{5}$	$1 = \frac{8}{8}$	$1 = \frac{10}{10}$
$2 = \frac{6}{3}$	$2 = \frac{10}{5}$	$2 = \frac{16}{8}$	$2 = \frac{20}{10}$

$1 = \frac{\quad}{2}$	$1 = \frac{\quad}{12}$	$2 = \frac{\quad}{2}$	$2 = \frac{\quad}{12}$
$1 = \frac{\quad}{4}$	$1 = \frac{\quad}{15}$	$2 = \frac{\quad}{4}$	$2 = \frac{\quad}{15}$
$1 = \frac{\quad}{6}$	$1 = \frac{\quad}{14}$	$2 = \frac{\quad}{6}$	$2 = \frac{\quad}{14}$
$1 = \frac{\quad}{7}$	$1 = \frac{\quad}{16}$	$2 = \frac{\quad}{7}$	$2 = \frac{\quad}{16}$
$1 = \frac{\quad}{9}$	$1 = \frac{\quad}{18}$	$2 = \frac{\quad}{9}$	$2 = \frac{\quad}{18}$
$3 = \frac{\quad}{2}$	$5 = \frac{\quad}{2}$	$4 = \frac{\quad}{3}$	$6 = \frac{\quad}{2}$
$3 = \frac{\quad}{4}$	$5 = \frac{\quad}{3}$	$4 = \frac{\quad}{2}$	$6 = \frac{\quad}{4}$
$3 = \frac{\quad}{3}$	$5 = \frac{\quad}{4}$	$4 = \frac{\quad}{5}$	$6 = \frac{\quad}{3}$
$3 = \frac{\quad}{5}$	$5 = \frac{\quad}{6}$	$4 = \frac{\quad}{8}$	$6 = \frac{\quad}{5}$
$3 = \frac{\quad}{8}$	$5 = \frac{\quad}{9}$	$4 = \frac{\quad}{7}$	$6 = \frac{\quad}{8}$

$2 = \frac{2}{5}$	$3 = \frac{3}{7}$	$1 = \frac{1}{16}$	$3 = \frac{3}{9}$
$7 = \frac{7}{2}$	$2 = \frac{2}{9}$	$4 = \frac{4}{12}$	$6 = \frac{6}{9}$
$8 = \frac{8}{3}$	$5 = \frac{5}{10}$	$3 = \frac{3}{10}$	$6 = \frac{6}{15}$
$4 = \frac{4}{4}$	$8 = \frac{8}{4}$	$7 = \frac{7}{3}$	$8 = \frac{8}{8}$
$5 = \frac{5}{5}$	$9 = \frac{9}{2}$	$9 = \frac{9}{4}$	$2 = \frac{2}{15}$
$3 = \frac{3}{15}$	$2 = \frac{2}{10}$	$5 = \frac{5}{7}$	$6 = \frac{6}{8}$
$7 = \frac{7}{4}$	$6 = \frac{6}{7}$	$2 = \frac{2}{25}$	$2 = \frac{2}{30}$
$8 = \frac{8}{10}$	$5 = \frac{5}{20}$	$4 = \frac{4}{12}$	$4 = \frac{4}{50}$
$2 = \frac{2}{12}$	$4 = \frac{4}{25}$	$7 = \frac{7}{8}$	$3 = \frac{3}{20}$
$9 = \frac{9}{8}$	$8 = \frac{8}{5}$	$3 = \frac{3}{12}$	$9 = \frac{9}{10}$
$6 = \frac{6}{12}$	$3 = \frac{3}{15}$	$2 = \frac{2}{11}$	$1 = \frac{1}{13}$
$7 = \frac{7}{15}$	$2 = \frac{2}{7}$	$8 = \frac{8}{7}$	$4 = \frac{4}{7}$
$3 = \frac{3}{7}$	$5 = \frac{5}{8}$	$3 = \frac{3}{12}$	$8 = \frac{8}{6}$
$5 = \frac{5}{8}$	$7 = \frac{7}{7}$	$5 = \frac{5}{9}$	$3 = \frac{3}{15}$
$9 = \frac{9}{11}$	$4 = \frac{4}{9}$	$7 = \frac{7}{6}$	$7 = \frac{7}{9}$
$11 = \frac{11}{2}$	$11 = \frac{11}{10}$	$16 = \frac{16}{2}$	$13 = \frac{13}{2}$
$13 = \frac{13}{4}$	$17 = \frac{17}{3}$	$14 = \frac{14}{7}$	$16 = \frac{16}{5}$
$16 = \frac{16}{3}$	$15 = \frac{15}{2}$	$15 = \frac{15}{3}$	$19 = \frac{19}{6}$
$19 = \frac{19}{5}$	$19 = \frac{19}{3}$	$17 = \frac{17}{5}$	$20 = \frac{20}{2}$
$18 = \frac{18}{4}$	$12 = \frac{12}{4}$	$18 = \frac{18}{7}$	$23 = \frac{23}{4}$

De breuk $2\frac{1}{3}$ is samengesteld uit 2 helen en $\frac{1}{3}$ deel.

We kunnen het geheel omzetten in $2 \times \frac{3}{3} = \frac{6}{3} + \frac{1}{3} = \frac{7}{3}$

Hieronder volgen nog 2 voorbeelden:

$$3\frac{1}{4} = 3 + \frac{1}{4} = \frac{12}{4} + \frac{1}{4} = \frac{13}{4} \quad 6\frac{1}{12} = 6 + \frac{1}{12} = \frac{72}{12} + \frac{1}{12} = \frac{73}{12}$$

$1\frac{1}{2} = \frac{3}{2}$	$2\frac{1}{3} = \frac{5}{3}$	$3\frac{1}{2} = \frac{7}{2}$	$2\frac{1}{5} = \frac{11}{5}$
$1\frac{2}{3} = \frac{5}{3}$	$2\frac{1}{5} = \frac{11}{5}$	$5\frac{1}{4} = \frac{21}{4}$	$3\frac{1}{3} = \frac{10}{3}$
$1\frac{3}{4} = \frac{7}{4}$	$2\frac{1}{7} = \frac{15}{7}$	$2\frac{1}{7} = \frac{15}{7}$	$2\frac{1}{9} = \frac{19}{9}$
$1\frac{1}{7} = \frac{8}{7}$	$2\frac{2}{6} = \frac{14}{6}$	$3\frac{2}{8} = \frac{26}{8}$	$4\frac{1}{2} = \frac{9}{2}$
$1\frac{4}{5} = \frac{9}{5}$	$2\frac{2}{4} = \frac{10}{4}$	$2\frac{1}{9} = \frac{19}{9}$	$5\frac{1}{3} = \frac{16}{3}$
$5\frac{1}{2} = \frac{11}{2}$	$4\frac{1}{6} = \frac{25}{6}$	$1\frac{1}{9} = \frac{10}{9}$	$5\frac{2}{3} = \frac{17}{3}$
$3\frac{3}{4} = \frac{15}{4}$	$2\frac{3}{9} = \frac{11}{3}$	$5\frac{1}{6} = \frac{31}{6}$	$9\frac{2}{8} = \frac{74}{8}$
$4\frac{2}{9} = \frac{38}{9}$	$2\frac{3}{8} = \frac{19}{4}$	$7\frac{1}{3} = \frac{22}{3}$	$8\frac{3}{12} = \frac{99}{12}$
$6\frac{1}{5} = \frac{31}{5}$	$4\frac{2}{3} = \frac{14}{3}$	$2\frac{2}{9} = \frac{20}{9}$	$7\frac{8}{10} = \frac{78}{10}$
$2\frac{2}{7} = \frac{16}{7}$	$2\frac{5}{7} = \frac{19}{7}$	$4\frac{2}{10} = \frac{42}{10}$	$5\frac{2}{12} = \frac{62}{12}$
$8\frac{3}{4} = \frac{35}{4}$	$8\frac{2}{7} = \frac{58}{7}$	$9\frac{1}{11} = \frac{100}{11}$	$14\frac{1}{4} = \frac{57}{4}$
$7\frac{2}{5} = \frac{37}{5}$	$3\frac{2}{14} = \frac{22}{7}$	$11\frac{1}{2} = \frac{23}{2}$	$15\frac{2}{5} = \frac{77}{5}$
$9\frac{1}{3} = \frac{28}{3}$	$2\frac{8}{15} = \frac{38}{15}$	$12\frac{1}{4} = \frac{49}{4}$	$11\frac{2}{7} = \frac{79}{7}$
$7\frac{1}{11} = \frac{78}{11}$	$6\frac{4}{10} = \frac{32}{5}$	$10\frac{3}{9} = \frac{37}{3}$	$13\frac{2}{8} = \frac{53}{4}$
$3\frac{5}{6} = \frac{23}{6}$	$4\frac{3}{13} = \frac{55}{13}$	$16\frac{2}{3} = \frac{50}{3}$	$20\frac{1}{2} = \frac{41}{2}$

Het vereenvoudigen van breuken en omzetten in % (procenten).

$$\frac{2}{4} = \frac{1}{2} = 50\%$$

$$\frac{2}{8} = \frac{1}{4} = 25\%$$

$$\frac{3}{6} = \frac{1}{2} = 50\%$$

$$\frac{2}{6} = \frac{1}{3} = 33\frac{1}{3}\%$$

$$\frac{2}{4} = \text{---} = \text{---} \%$$

$$\frac{4}{10} = \text{---} = \text{---} \%$$

$$\frac{4}{8} = \text{---} = \text{---} \%$$

$$\frac{6}{15} = \text{---} = \text{---} \%$$

$$\frac{2}{8} = \text{---} = \text{---} \%$$

$$\frac{10}{20} = \text{---} = \text{---} \%$$

$$\frac{4}{16} = \text{---} = \text{---} \%$$

$$\frac{12}{16} = \text{---} = \text{---} \%$$

$$\frac{6}{8} = \text{---} = \text{---} \%$$

$$\frac{4}{6} = \text{---} = \text{---} \%$$

$$\frac{3}{9} = \text{---} = \text{---} \%$$

$$\frac{6}{24} = \text{---} = \text{---} \%$$

$$\frac{2}{6} = \text{---} = \text{---} \%$$

$$\frac{8}{10} = \text{---} = \text{---} \%$$

$$\frac{2}{16} = \text{---} = \text{---} \%$$

$$\frac{7}{14} = \text{---} = \text{---} \%$$

$$\frac{5}{10} = \text{---} = \text{---} \%$$

$$\frac{2}{10} = \text{---} = \text{---} \%$$

$$\frac{3}{24} = \text{---} = \text{---} \%$$

$$\frac{3}{30} = \text{---} = \text{---} \%$$

$$\frac{4}{4} = \text{---} = \text{---} \%$$

$$\frac{10}{40} = \text{---} = \text{---} \%$$

$$\frac{3}{12} = \text{---} = \text{---} \%$$

$$\frac{15}{30} = \text{---} = \text{---} \%$$

$$\frac{3}{15} = \text{---} = \text{---} \%$$

$$\frac{16}{24} = \text{---} = \text{---} \%$$

$$\frac{2}{20} = \text{---} = \text{---} \%$$

$$\frac{6}{16} = \text{---} = \text{---} \%$$

$$\frac{4}{20} = \text{---} = \text{---} \%$$

$$\frac{14}{16} = \text{---} = \text{---} \%$$