Rappel 3

Fractions : Fiche d'exercices - Correction

Exercice 1

Effectuer ces calculs puis **simplifier** les résultats.

a. $\frac{3}{17}+\frac{8}{17}=\frac{3+8}{17}=\frac{11}{17}$

b. $\frac{-6}{5}+\frac{8}{5}=\frac{-6+8}{5}=\frac{2}{5}$

c. $\frac{-4}{33}+\frac{-13}{33}=\frac{-4+(-13)}{33}=\frac{-17}{33}$

d. $\frac{15}{47}-\frac{27}{47}=\frac{15-27}{47}=\frac{-12}{47}$

e. $\frac{-5}{19}+\frac{-7}{19}=\frac{-5+(-7)}{19}=\frac{-12}{19}$

f. $\frac{-11}{25}-\frac{-30}{25}=\frac{-11-(-30)}{25}=\frac{-11+30}{25}=\frac{19}{25}$

Exercice 2

Effectuer ces calculs puis **simplifier** les résultats.

a. $\frac{3}{5}+\frac{14}{10}=\frac{3\times2}{5\times2}+\frac{14}{10}=\frac{6}{10}+\frac{14}{10}=\frac{6+14}{10}=\frac{20}{10}=2$

a. (bis) $\frac{3}{5}+\frac{14}{10}=\frac{3}{5}+\frac{14\div2}{10\div2}=\frac{3}{5}+\frac{7}{5}=\frac{10}{5}=2$

b. $\frac{3}{6}+\frac{5}{18}=\frac{3\times3}{6\times3}+\frac{5}{18}=\frac{9}{18}+\frac{5}{18}=\frac{14}{18}=\frac{14\div2}{18\div2}=\frac{7}{9}$

c. $\frac{7}{3}+\frac{11}{4}=\frac{7\times4}{3\times4}+\frac{11\times3}{4\times3}=\frac{28}{12}+\frac{33}{12}=\frac{61}{12}$

d. $\frac{12}{35}-\frac{6}{7}=\frac{12}{35}-\frac{6\times5}{7\times5}=\frac{12}{35}-\frac{30}{35}=\frac{-18}{35}$

e. $\frac{9}{3}-\frac{-21}{27}=\frac{9\times9}{3\times9}-\frac{-21}{27}=\frac{81}{27}-\frac{-21}{27}=\frac{102}{27}=\frac{102\div3}{27\div3}=\frac{34}{9}$

f. $\frac{-12}{32}+\frac{-5}{4}=\frac{-12}{32}+\frac{-5\times8}{4\times8}=\frac{-12}{32}+\frac{-40}{32}=\frac{-52}{32}=\frac{-52\div4}{32\div4}=\frac{-13}{8}$

g. $\frac{-15}{10}+\frac{11}{6}=\frac{-15\times3}{10\times3}+\frac{11\times5}{6\times5}=\frac{-45}{30}+\frac{55}{30}=\frac{10}{30}=\frac{10\div10}{30\div10}=\frac{1}{3}$

g. (bis) $\frac{-15}{10}+\frac{11}{6}=\frac{-15\div5}{10\div5}+\frac{11}{6}=\frac{-3}{2}+\frac{11}{6}=\frac{-3\times3}{2\times3}+\frac{11}{6}=\frac{-9}{6}+\frac{11}{6}=\frac{2}{6}=\frac{2\div2}{6\div2}=\frac{1}{3}$

h. $1+\frac{5}{42}=\frac{1}{1}+\frac{5}{42}=\frac{1\times42}{1\times42}+\frac{5}{42}=\frac{42}{42}+\frac{5}{42}=\frac{47}{42}$

i. $2-\frac{-21}{13}=\frac{2\times13}{1\times13}-\frac{-21}{13}=\frac{26}{13}-\frac{-21}{13}=\frac{26+21}{13}=\frac{47}{13}$

Exercice 3

Effectuer ces calculs puis **simplifier** les résultats.

a.

$$\begin{aligned} & \frac{5}{2}+\frac{3}{4}+\frac{-7}{8} \\ = & \frac{5\times 4}{2\times 4}+\frac{3\times 2}{4\times 2}+\frac{-7}{8} \\ = & \frac{20}{8}+\frac{6}{8}+\frac{-7}{8} \\ = & \frac{19}{8} \end{aligned}$$

b.

$$\begin{aligned} & \frac{4}{15}+\frac{2}{5}-\frac{7}{30} \\ = & \frac{4\times 2}{15\times 2}+\frac{2\times 6}{5\times 6}-\frac{7}{30} \\ = & \frac{8}{30}+\frac{12}{30}-\frac{7}{30} \\ = & \frac{13}{30} \end{aligned}$$

c.

$$\begin{aligned} & \frac{7}{12}+\frac{-5}{8}+\frac{11}{3} \\ = & \frac{7\times 2}{12\times 2}+\frac{-5\times 3}{8\times 3}+\frac{11\times 8}{3\times 8} \\ = & \frac{14}{24}+\frac{-15}{24}+\frac{88}{24} \\ = & \frac{87}{24} \end{aligned}$$

d.

$$\begin{aligned} & \frac{22}{28}-\frac{3}{7}-\frac{-12}{56} \\ = & \frac{22\times 2}{28\times 2}-\frac{3\times 8}{7\times 8}-\frac{-12}{56} \\ = & \frac{44}{56}-\frac{24}{56}-\frac{-12}{56} \\ = & \frac{44-24-(-12)}{56} \\ = & \frac{32}{56} \\ = & \frac{32\div 4}{56\div 4} \\ = & \frac{8}{13} \end{aligned}$$

Exercice 4

Effectuer les calculs suivants en donnant le résultat sous la forme d'une fraction irréductible.

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

$A=\frac{7}{7}-\frac{2}{7}$

$A=\frac{5}{7}$

$B=9-\frac{5}{2}$

$B=\frac{18}{2}-\frac{5}{2}$

$B=\frac{13}{2}$

$C=\frac{7}{6}+6$

$C=\frac{7}{6}+\frac{36}{6}$

$C=\frac{43}{6}$

$D=5-\frac{-4}{3}$

$D=\frac{15}{3}-\frac{-4}{3}$

$D=\frac{19}{3}$

$E=\frac{8}{5}-3$

$E=\frac{8}{5}-\frac{15}{5}$

$E=\frac{-7}{5}$

$F=\frac{-13}{8}+6$

$F=\frac{-13}{8}+\frac{48}{6}$

$F=\frac{-13}{8}+\frac{35}{8}$

Exercice 5

Effectuer les calculs suivants :

$A = \frac{3}{4} \times \frac{5}{7} = \frac{3 \times 5}{4 \times 7} = \frac{15}{28}$

$B = \frac{10}{8} \times \frac{6}{9} = \frac{10 \times 6}{8 \times 9} = \frac{60}{72} = \frac{60 \div 2}{72 \div 2} = \frac{30}{36} = \frac{30 \div 6}{36 \div 6} = \frac{5}{6}$

Autre possibilité : $B = \frac{10}{8} \times \frac{6}{9} = \frac{10 \div 2}{8 \div 2} \times \frac{6 \div 3}{9 \div 3} = \frac{5}{4} \times \frac{2}{3} = \frac{10}{12} = \frac{10 \div 2}{12 \div 2} = \frac{5}{6}$

$C = \frac{6}{14} \times (-5) = \frac{6}{14} \times \frac{(-5)}{1} = \frac{6 \times (-5)}{14} = \frac{-30}{14} = \frac{-30 \div 2}{14 \div 2} = \frac{-15}{7}$

$D = \frac{-12}{4} \times \frac{-4}{10} = \frac{\cancel{2} \times (-6) \times (-1) \times \cancel{4}}{\cancel{4} \times 5 \times \cancel{2}} = \frac{6}{5}$ $\quad D = \frac{-12}{4} \times \frac{-4}{10} = \frac{-12 \div 4}{4 \div 4} \times \frac{-4 \div 2}{10 \div 2} = -3 \times \frac{-2}{5} = \frac{6}{5}$

$E = \frac{1}{2} \times \frac{9}{11} = \frac{9}{22}$ $\quad F = \frac{-6}{3} \times \frac{11}{-3} = -2 \times \frac{11}{-3} = \frac{-22}{-3} = \frac{-22 \times (-1)}{-3 \times (-1)} = \frac{22}{3}$

$G = -10 \times \frac{14}{3} = \frac{-140}{3}$

$H = \frac{-6}{-7} \times \frac{-5}{-10} = \frac{30}{70} = \frac{30 \div 10}{70 \div 10} = \frac{3}{7}$ $\quad H = \frac{-6}{-7} \times \frac{-5}{-10} = \frac{6}{7} \times \frac{1}{2} = \frac{6}{14} = \frac{6 \div 2}{14 \div 2} = \frac{3}{7}$

$I = 8 \times \frac{3}{11} = \frac{24}{11}$ $\quad J = \frac{5}{-13} \times \frac{-11}{3} = \frac{-55}{-39} = \frac{-55 \times (-1)}{-39 \times (-1)} = \frac{39}{55}$

$K = \frac{4}{4} \times \frac{560}{980} = \underbrace{\frac{4}{4}}_{=1} \times \frac{560 \div 10}{980 \div 10} = \frac{56}{98} = \frac{56 \div 2}{98 \div 2} = \frac{28}{49} = \frac{28 \div 7}{49 \div 7} = \frac{4}{7}$ $\quad L = \frac{1}{2} \times 55 = \frac{55}{2}$

Exercice 6

Effectuer les calculs suivants et donner le résultat sous forme d'une fraction irréductible.

$A = \frac{12}{14} \times \frac{21}{8} = \frac{\cancel{4} \times 3 \times \cancel{7} \times 3}{\cancel{7} \times 2 \times 2 \times \cancel{4}} = \frac{9}{4}$ $\quad B = \frac{7}{10} \times \frac{15}{14} = \frac{\cancel{7} \times \cancel{5} \times 3}{\cancel{5} \times 2 \times \cancel{7} \times 2} = \frac{3}{4}$

$C = \frac{-30}{55} \times \frac{11}{-18} = \frac{\cancel{-1} \times \cancel{6} \times \cancel{5} \times \cancel{11}}{\cancel{5} \times \cancel{11} \times \cancel{6} \times 3 \times \cancel{-1}} = \frac{1}{3}$ $\quad D = \frac{7}{15} \times \frac{35}{11} = \frac{7 \times \cancel{5} \times 7}{3 \times \cancel{5} \times 11} = \frac{49}{33}$

$E = \frac{3}{10} \times \frac{-14}{15} = \frac{\cancel{3} \times \cancel{2} \times (-7)}{\cancel{2} \times 5 \times \cancel{3} \times 5} = \frac{-7}{25}$ $\quad F = \frac{42}{18} \times \frac{27}{140} = \frac{\cancel{6} \times 7 \times 9 \times \cancel{3}}{\cancel{6} \times \cancel{3} \times 14 \times 10} = = \frac{\cancel{7} \times 9}{\cancel{7} \times 2 \times 10} = \frac{9}{20}$

$G = \frac{2}{11} \times \frac{2}{15} \times \frac{55}{8} = \frac{\cancel{2} \times \cancel{2} \times \cancel{5} \times \cancel{11}}{\cancel{11} \times \cancel{5} \times 3 \times 2\cancel{2} \times \cancel{2}} = \frac{1}{6}$ $\quad H = \frac{21}{-4} \times \frac{-2}{15} \times \frac{5}{-14} = \frac{\cancel{7} \times \cancel{3} \times \cancel{(-2)} \times \cancel{5}}{2 \times \cancel{(-2)} \times \cancel{5} \times \cancel{3} \times \cancel{7} \times (-2)} = \frac{-1}{4}$

Exercice 7

Donner le résultat des calculs suivants, en simplifiant le résultat.

Diviser par un nombre non nul : multiplier par son **inverse**.

$A = \frac{7}{6} \div \frac{3}{4} = \frac{7}{6} \times \frac{4}{3} = \frac{28}{18} = \frac{28 \div 2}{18 \div 2} = \frac{14}{9}$

$B = \frac{5}{10} \div \frac{1}{2} = \frac{5 \div 5}{10 \div 5} \times \frac{2}{1} = \frac{1}{2} \times 2 = 1$

$C = \frac{4}{5} \div \frac{1}{15} = \frac{4}{5} \times 15 = \frac{4 \times 3 \times \cancel{5}}{\cancel{5}} = 12$

$D = \frac{-2}{5} \div \frac{6}{7} = \frac{-2}{5} \times \frac{7}{6} = \frac{-14}{30} = \frac{-14 \div 2}{30 \div 2} = \frac{-7}{15}$

$E = \frac{-5}{13} \div \frac{3}{13} = \frac{-5}{13} \times \frac{13}{3} = \frac{-5 \times \cancel{13}}{\cancel{13} \times 3} = \frac{-5}{3}$

$F = \frac{-3}{4} \div \frac{75}{100} = \frac{-3}{4} \times \frac{100}{75} \frac{-3}{4} \times \frac{100 \div 25}{75 \div 25} = \frac{-3}{4} \times \frac{4}{3} = \frac{-1 \times \cancel{3} \times \cancel{4}}{\cancel{4} \times \cancel{3}} = -1$

Exercice 8

Donner le résultat des calculs suivants, en simplifiant le résultat.

Diviser par un nombre non nul : multiplier par son **inverse**.

$A = \frac{1}{5} \div 2 = \frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$

$B = (-9) \div \frac{4}{15} = -9 \times \frac{15}{4} = \frac{-135}{4}$

$C = \frac{3}{8} \div (-6) = \frac{3}{8} \times \frac{1}{-6} = \frac{\cancel{3} \times 1}{8 \times (-2) \times \cancel{3}} = \frac{1}{-16} = \frac{-1}{16}$

$D = \frac{\frac{2}{9}}{\frac{-5}{3}} = \frac{2}{9} \times \frac{3}{-5} = \frac{2 \times \cancel{3}}{\cancel{3} \times 3 \times (-5)} = \frac{2}{-15} = \frac{-2}{15}$

$E = \frac{\frac{22}{7}}{-11} = \frac{22}{7} \times \frac{1}{-11} = \frac{2 \times \cancel{11}}{7 \times \cancel{11} \times (-1)} = \frac{2}{-7} = \frac{-2}{7}$

$F = \frac{\frac{13}{7}}{\frac{2}{3}} = \frac{13}{7} \times \frac{3}{2} = \frac{39}{14}$

Exercice 9

Donner le résultat des calculs suivants, en simplifiant le résultat.

Attention aux priorités opératoires.

$$\begin{aligned} A &= \frac{2}{5} \div \frac{3}{15} + \frac{2}{15} - \frac{11}{9} \\ &= \frac{2}{5} \times \frac{15}{3} + \frac{2}{15} - \frac{11}{9} \\ &= \frac{2 \times \cancel{5} \times \cancel{3}}{\cancel{5} \times \cancel{3}} + \frac{2}{15} - \frac{11}{9} \\ &= 2 + \frac{2}{15} - \frac{11}{9} \\ &= \frac{90}{45} + \frac{2 \times 3}{15 \times 3} - \frac{11 \times 5}{9 \times 5} \\ &= \frac{90}{45} + \frac{6}{45} - \frac{55}{45} \\ &= \frac{41}{45} \end{aligned}$$

$$\begin{aligned} B &= \frac{9}{2} - \frac{5}{2} \div \frac{15}{8} \\ &= \frac{9}{2} - \frac{5}{2} \times \frac{8}{15} \\ &= \frac{9}{2} - \frac{\cancel{5} \times \cancel{2} \times 4}{\cancel{2} \times 3 \times \cancel{5}} \\ &= \frac{9}{2} - \frac{4}{3} \\ &= \frac{9 \times 3}{2 \times 3} - \frac{4 \times 2}{3 \times 2} \\ &= \frac{27}{6} - \frac{8}{6} \\ &= \frac{19}{6} \end{aligned}$$

$$C = \frac{\frac{2}{3}+\frac{5}{6}}{7} = \frac{\frac{2\times 2}{3\times 2}+\frac{5}{6}}{7} = \frac{\frac{4}{6}+\frac{5}{6}}{7} = \frac{\frac{9}{6}}{7} = \frac{9\div 3}{6\div 3}\times\frac{1}{7} = \frac{3}{2}\times\frac{1}{7} = \frac{3}{14}$$

$$D = \frac{\frac{-3}{4}+\frac{1}{2}}{\frac{2}{5}-\frac{5}{2}} = \frac{\frac{-3}{4}+\frac{1\times 2}{2\times 2}}{\frac{2\times 2}{5\times 2}-\frac{5\times 5}{2\times 5}} = \frac{\frac{-3}{4}+\frac{2}{4}}{\frac{4}{10}-\frac{25}{10}} = \frac{\frac{-1}{4}}{\frac{-21}{10}} = \frac{-1}{4}\times\frac{10}{-21} = \frac{\cancel{-1}\times\cancel{2}\times 5}{\cancel{2}\times 2\times 21\times\cancel{(-1)}} = \frac{5}{42}$$

$$E = \frac{\frac{2}{3}}{\frac{5}{6}} - \frac{4}{10} = \frac{2}{3}\times\frac{6}{5} - \frac{4\div 2}{10\div 2} = \frac{2\times 2\times\cancel{3}}{\cancel{3}\times 5} - \frac{2}{5} = \frac{4}{5}-\frac{2}{5} = \frac{2}{5}$$

$$\begin{aligned}
F &= \left(\frac{3}{5}-\frac{1}{4}\right)\div\left(2-\frac{8}{5}\right)\\
&= \left(\frac{3\times 4}{5\times 4}-\frac{1\times 5}{4\times 5}\right)\div\left(\frac{10}{5}-\frac{8}{5}\right)\\
&= \left(\frac{12}{20}-\frac{5}{20}\right)\div\frac{2}{5}\\
&= \frac{7}{20}\times\frac{5}{2}\\
&= \frac{7\times\cancel{5}}{4\times\cancel{5}\times 2}\\
&= \frac{7}{8}
\end{aligned}$$

$$\begin{aligned}
G &= \left(\frac{4}{5}+\frac{-3}{2}\right)\div\left(\frac{-9}{4}-\frac{1}{6}\right)\\
&= \left(\frac{4\times 2}{5\times 2}+\frac{-3\times 5}{2\times 5}\right)\div\left(\frac{-9\times 3}{4\times 3}-\frac{1\times 2}{6\times 2}\right)\\
&= \left(\frac{8}{10}+\frac{-15}{10}\right)\div\left(\frac{-27}{12}-\frac{2}{12}\right)\\
&= \frac{-7}{10}\div\frac{-29}{12}\\
&= \frac{-7}{10}\times\frac{12}{-29}\\
&= \frac{-84}{-290}\\
&= \frac{-84\times(-1)}{-290\times(-1)}\\
&= \frac{84}{290}
\end{aligned}$$