

Chapitre 8 - Fractions

C.1

1 a Les multiples de 6 strictement inférieurs à 30 sont :
0 ; 6 ; 12 ; 18 ; 24

b Compléter les pointillés :

$$\frac{5}{6} = \frac{10}{12} = \frac{15}{18} = \frac{20}{24}$$

2 $\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24} = \frac{21}{28}$

3 D'après les deux questions précédentes, on a :

$$\frac{5}{6} = \frac{10}{12} ; \frac{3}{4} = \frac{9}{12}$$

On en déduit la comparaison suivante :

$$\frac{10}{12} > \frac{9}{12}$$

$$\frac{5}{6} > \frac{3}{4}$$

C.2

a $\frac{1}{3} + \frac{1}{2}$
 $= \frac{2}{6} + \frac{3}{6}$
 $= \frac{2+3}{6}$
 $= \frac{5}{6}$

b $\frac{3}{5} + \frac{7}{10}$
 $= \frac{6}{10} + \frac{7}{10}$
 $= \frac{6+7}{10}$
 $= \frac{13}{10}$

c $\frac{5}{6} + \frac{3}{4}$
 $= \frac{10}{12} + \frac{9}{12}$
 $= \frac{10+9}{12}$
 $= \frac{19}{12}$

d $\frac{8}{7} + \frac{8}{3}$
 $= \frac{24}{21} + \frac{56}{21}$
 $= \frac{24+56}{21}$
 $= \frac{80}{21}$

e $\frac{2}{15} + \frac{1}{10}$
 $= \frac{4}{30} + \frac{3}{30}$
 $= \frac{4+3}{30}$
 $= \frac{7}{30}$

f $\frac{5}{6} + \frac{10}{9}$
 $= \frac{15}{18} + \frac{20}{18}$
 $= \frac{15+20}{18}$
 $= \frac{35}{18}$

C.3

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

b $\frac{-3}{4} = -\frac{3}{4}$

c $-\frac{3}{-4} = \frac{3}{4}$

d $\frac{12}{-15} = -\frac{4}{5}$

e $\frac{27}{18} = \frac{-3}{-2}$

f $\frac{36}{24} = \frac{3}{2} = -\frac{15}{-10}$

C.4 Compléter les pointillés afin de vérifier les égalités suivantes :

a $\frac{8}{-5} = \frac{-32}{20}$

b $\frac{-15}{35} = -\frac{3}{7}$

c $-\frac{4}{11} = \frac{-16}{44}$

d $\frac{36}{81} = -\frac{-4}{9}$

e $-\frac{7}{-10} = \frac{28}{40}$

f $\frac{12}{20} = \frac{3}{5} = \frac{-15}{-25}$

C.5

a $\frac{2}{4} + \frac{2}{-4}$
 $= \frac{2}{4} + \frac{-2}{4}$
 $= \frac{2+(-2)}{4}$
 $= \frac{0}{4}$
 $= 0$

b $\frac{5}{3} + \frac{-17}{6}$
 $= \frac{10}{6} + \frac{-17}{6}$
 $= \frac{10+(-17)}{6}$
 $= \frac{-7}{6}$
 $= -\frac{7}{6}$

c $-\frac{5}{12} - \frac{-2}{3}$
 $= -\frac{5}{12} + \frac{2}{3}$
 $= -\frac{5}{12} + \frac{8}{12}$
 $= \frac{-5+8}{12}$
 $= \frac{3}{12}$
 $= \frac{\cancel{3}}{\cancel{3} \times 4}$
 $= \frac{1}{4}$

d $2 + \frac{-3}{2}$
 $= \frac{4}{2} + \frac{-3}{2}$
 $= \frac{4+(-3)}{2}$
 $= \frac{1}{2}$

C.6

a $\frac{2}{7} + \frac{3}{11}$
 $= \frac{22}{77} + \frac{21}{77}$
 $= \frac{22+21}{77}$
 $= \frac{43}{77}$

b $\frac{5}{8} + 2$
 $= \frac{5}{8} + \frac{16}{8}$
 $= \frac{5+16}{8}$
 $= \frac{21}{8}$

c $-\frac{3}{11} + \frac{-4}{5}$
 $= -\frac{15}{55} + \frac{-44}{55}$
 $= \frac{-15-44}{55}$
 $= \frac{-59}{55}$
 $= -\frac{59}{55}$

C.7

a $-\frac{1}{6} + \frac{1}{-14}$
 $= -\frac{1}{6} + \frac{-1}{14}$
 $= -\frac{7}{42} + \frac{-3}{42}$
 $= \frac{-7+(-3)}{42}$
 $= \frac{-10}{42}$
 $= -\frac{5 \times \cancel{2}}{21 \times \cancel{2}}$
 $= -\frac{5}{21}$

b $\frac{3}{10} - \frac{7}{15}$
 $= \frac{9}{30} - \frac{14}{30}$
 $= \frac{9-14}{30}$
 $= \frac{-5}{30}$
 $= -\frac{1}{6}$



$$\begin{aligned}
 \text{c) } & \frac{-3}{15} - \frac{-4}{25} \\
 &= \frac{-15}{75} - \frac{-12}{75} \\
 &= \frac{-15 - (-12)}{75} \\
 &= \frac{-15 + 12}{75} \\
 &= \frac{-3}{75} \\
 &= -\frac{\cancel{3}}{\cancel{3} \times 25} \\
 &= -\frac{1}{25}
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } & \frac{5}{6} + \frac{9}{-10} \\
 &= \frac{25}{30} + \frac{-27}{30} \\
 &= \frac{25 + (-27)}{30} \\
 &= \frac{-2}{30} \\
 &= -\frac{1 \times \cancel{2}}{15 \times \cancel{2}} \\
 &= -\frac{1}{15}
 \end{aligned}$$

$$\begin{aligned}
 \text{a) } & \frac{5}{3} + \frac{5}{6} \\
 &= \frac{10}{6} + \frac{5}{6} \\
 &= \frac{10 + 5}{6} \\
 &= \frac{15}{6} \\
 &= \frac{5 \times \cancel{3}}{2 \times \cancel{3}} \\
 &= \frac{5}{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{5}{7} - \frac{1}{21} \\
 &= \frac{15}{21} - \frac{1}{21} \\
 &= \frac{15 - 1}{21} \\
 &= \frac{14}{21} \\
 &= \frac{\cancel{7} \times 2}{\cancel{7} \times 3} \\
 &= \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{5}{2} \times \frac{4}{15} \\
 &= \frac{5 \times 4}{2 \times 15} \\
 &= \frac{20}{30} \\
 &= \frac{2 \times \cancel{10}}{3 \times \cancel{10}} \\
 &= \frac{2}{3}
 \end{aligned}$$

C.8

$$\begin{aligned}
 \text{a) } & \frac{5 \times 21}{14 \times 20} \\
 &= \frac{\cancel{5} \times \cancel{7} \times 3}{\cancel{7} \times 2 \times \cancel{5} \times 4} \\
 &= \frac{3}{2 \times 4} \\
 &= \frac{3}{8}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{15 \times 12}{9 \times 25} \\
 &= \frac{\cancel{5} \times \cancel{3} \times 4 \times \cancel{3}}{\cancel{3} \times \cancel{3} \times 5 \times \cancel{5}} \\
 &= \frac{4}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{24 \times 28}{18 \times 7} \\
 &= \frac{\cancel{6} \times 4 \times \cancel{7} \times 4}{\cancel{6} \times 3 \times \cancel{7}} \\
 &= \frac{16}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } & 1 + \frac{1}{2} \\
 &= \frac{2}{2} + \frac{1}{2} \\
 &= \frac{2 + 1}{2} \\
 &= \frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{e) } & 5 - \frac{4}{3} \\
 &= \frac{15}{3} - \frac{4}{3} \\
 &= \frac{15 - 4}{3} \\
 &= \frac{11}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{f) } & \frac{9}{2} \times \frac{4}{6} \\
 &= \frac{9 \times 4}{2 \times 6} \\
 &= \frac{36}{12} \\
 &= \frac{3 \times \cancel{12}}{\cancel{12}} \\
 &= \frac{3}{1} \\
 &= 3
 \end{aligned}$$

C.9

$$\begin{aligned}
 \text{a) } & \frac{9}{7} \times \frac{14}{15} \\
 &= \frac{9}{\cancel{7}} \times \frac{\cancel{7} \times 2}{15} \\
 &= \frac{3 \times \cancel{3}}{1} \times \frac{2}{\cancel{3} \times 5} \\
 &= \frac{3}{1} \times \frac{2}{5} \\
 &= \frac{6}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{7}{8} \times \frac{3}{14} \times \frac{4}{9} \\
 &= \frac{\cancel{7}}{\cancel{4} \times 2} \times \frac{\cancel{3}}{\cancel{7} \times 2} \times \frac{\cancel{4}}{3 \times \cancel{3}} \\
 &= \frac{1}{2 \times 2 \times 3} \\
 &= \frac{1}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{17}{81} \times \frac{9}{8} \times \frac{7}{34} \times \frac{64}{70} \\
 &= \frac{\cancel{17} \times \cancel{9} \times \cancel{7} \times \cancel{8} \times 8}{\cancel{9} \times \cancel{9} \times \cancel{8} \times \cancel{17} \times \cancel{2} \times \cancel{7} \times 10} \\
 &= \frac{8}{9 \times 2 \times 10} \\
 &= \frac{2 \times \cancel{2} \times \cancel{2}}{9 \times \cancel{2} \times \cancel{2} \times 5} \\
 &= \frac{2}{45}
 \end{aligned}$$

C.12

$$\begin{aligned}
 \text{a) } & \frac{5}{7} + \frac{2}{21} \\
 &= \frac{5 \times 3}{7 \times 3} + \frac{2}{21} \\
 &= \frac{15}{21} + \frac{2}{21} \\
 &= \frac{15 + 2}{21} \\
 &= \frac{17}{21}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{14}{25} \times \frac{15}{21} \\
 &= \frac{(2 \times 7) \times (5 \times 3)}{(5 \times 5) \times (7 \times 3)} \\
 &= \frac{2 \times \cancel{7} \times \cancel{5} \times \cancel{3}}{5 \times \cancel{5} \times \cancel{7} \times \cancel{3}} \\
 &= \frac{2}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{3}{16} + \frac{5}{4} \\
 &= \frac{3}{16} + \frac{5 \times 4}{4 \times 4} \\
 &= \frac{3}{16} + \frac{20}{16} \\
 &= \frac{3 + 20}{16} \\
 &= \frac{23}{16}
 \end{aligned}$$

C.10

$$\begin{aligned}
 \text{a) } & \frac{3 \times 2 \times 5}{2 \times 5 \times 7} \\
 &= \frac{\cancel{3} \times \cancel{2} \times \cancel{5}}{\cancel{2} \times \cancel{5} \times 7} \\
 &= \frac{3}{7}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{5 \times 12 \times 7}{7 \times 12 \times 3} \\
 &= \frac{5 \times \cancel{12} \times \cancel{7}}{\cancel{7} \times \cancel{12} \times 3} \\
 &= \frac{5}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{3 \times 4}{4 \times 5 \times 3} \\
 &= \frac{\cancel{3} \times \cancel{4}}{\cancel{4} \times 5 \times \cancel{3}} \\
 &= \frac{1}{5}
 \end{aligned}$$

C.11

$$\begin{aligned}
 \text{d) } & \frac{1}{9} \times \frac{81}{2} \\
 &= \frac{1 \times (9 \times 9)}{9 \times 2} \\
 &= \frac{1 \times \cancel{9} \times 9}{\cancel{9} \times 2} \\
 &= \frac{9}{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{e) } & \frac{43}{18} - \frac{20}{9} \\
 &= \frac{43}{18} - \frac{20 \times 2}{9 \times 2} \\
 &= \frac{43}{18} - \frac{40}{18} \\
 &= \frac{43 - 40}{18} \\
 &= \frac{3}{18} \\
 &= \frac{\cancel{3}}{\cancel{3} \times 6} \\
 &= \frac{1}{6}
 \end{aligned}$$

$$\begin{aligned}
 \text{f) } & \frac{65}{4} \times \frac{12}{15} \\
 &= \frac{(5 \times 13) \times (4 \times 3)}{4 \times (5 \times 3)} \\
 &= \frac{\cancel{5} \times 13 \times \cancel{4} \times \cancel{3}}{\cancel{4} \times \cancel{5} \times \cancel{3}} \\
 &= \frac{13}{1} \\
 &= 13
 \end{aligned}$$

C.13



$$\begin{aligned} \text{a) } \frac{3}{8} + \frac{3}{2} &= \frac{3}{8} + \frac{12}{8} \\ &= \frac{3+12}{8} \\ &= \frac{15}{8} \end{aligned}$$

$$\begin{aligned} \text{b) } 2 - \frac{1}{3} &= \frac{2}{1} - \frac{1}{3} \\ &= \frac{6}{3} - \frac{1}{3} \\ &= \frac{6-1}{3} \\ &= \frac{5}{3} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{32}{9} \times \frac{3}{8} &= \frac{32 \times 3}{9 \times 8} \\ &= \frac{(8 \times 4) \times 3}{(3 \times 3) \times 8} \\ &= \frac{8 \times 4 \times 3}{3 \times 3 \times 8} \\ &= \frac{4}{3} \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{1}{3} \times \frac{15}{2} &= \frac{1 \times 15}{3 \times 2} \\ &= \frac{1 \times 5 \times 3}{3 \times 2} \\ &= \frac{5}{2} \end{aligned}$$

La correction est disponible en vidéo :



C.14

$$\begin{aligned} \text{a) } \frac{5}{4} \times \frac{6}{15} &= \frac{5 \times 6}{4 \times 15} \\ &= \frac{30}{60} \\ &= \frac{1 \times 30}{2 \times 30} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{1}{10} - \frac{1}{14} &= \frac{7}{70} - \frac{5}{70} \\ &= \frac{7-5}{70} \\ &= \frac{2}{70} \\ &= \frac{1 \times 2}{35 \times 2} \\ &= \frac{1}{35} \end{aligned}$$

$$\begin{aligned} \text{c) } 3 \times \frac{7}{9} &= \frac{3 \times 7}{9} \\ &= \frac{7}{3} \end{aligned}$$

C.15

① ● Le calcul **A** donne la valeur 10.

● Le calcul **B** donne la valeur $\frac{7}{8}$.

② Voici les deux expressions représentant les deux calculs :

● Pour le calcul **A** : $\frac{40}{3} - \left(2 + \frac{2}{9}\right) \times \frac{3}{2}$

● Pour le calcul **B** : $\frac{5}{2} \times \frac{3}{4} - 1$

C.16

$$\begin{aligned} \text{a) } \left(\frac{1}{3} - \frac{1}{6}\right) \times \frac{5}{2} &= \left(\frac{2}{6} - \frac{1}{6}\right) \times \frac{5}{2} \\ &= \frac{2-1}{6} \times \frac{5}{2} \\ &= \frac{1}{6} \times \frac{5}{2} \\ &= \frac{1 \times 5}{6 \times 2} \\ &= \frac{5}{12} \end{aligned}$$

$$\begin{aligned} \text{b) } \left(4 - \frac{2}{3} \times \frac{3}{2}\right) \times \frac{4}{3} &= \left(4 - \frac{2 \times 3}{2 \times 3}\right) \times \frac{4}{3} \\ &= (4 - 1) \times \frac{4}{3} \\ &= 3 \times \frac{4}{3} \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{c) } \left(\frac{4}{5} - \frac{1}{10}\right) \times 3 &= \left(\frac{8}{10} - \frac{1}{10}\right) \times 3 \\ &= \left(\frac{8-1}{10}\right) \times 3 \\ &= \frac{7}{10} \times 3 \\ &= \frac{21}{10} \end{aligned}$$

C.17

$$\begin{aligned} \text{a) } \frac{2}{3} \times \frac{9}{16} - \frac{1}{16} &= \frac{2 \times 9}{3 \times 16} - \frac{1}{16} \\ &= \frac{18}{48} - \frac{1}{16} \\ &= \frac{18}{48} - \frac{1 \times 3}{16 \times 3} \\ &= \frac{18}{48} - \frac{3}{48} \\ &= \frac{18-3}{48} \\ &= \frac{15}{48} \\ &= \frac{5 \times 3}{16 \times 3} \\ &= \frac{5}{16} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{7}{5} \times \frac{3}{2} - \frac{3}{2} &= \frac{7 \times 3}{5 \times 2} - \frac{3}{2} \\ &= \frac{21}{10} - \frac{3 \times 5}{2 \times 5} \\ &= \frac{21}{10} - \frac{15}{10} \\ &= \frac{21-15}{10} \\ &= \frac{6}{10} \\ &= \frac{3 \times 2}{5 \times 2} \\ &= \frac{3}{5} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{3}{5} + \frac{1}{5} \times \frac{2}{3} &= \frac{3}{5} + \frac{1 \times 2}{5 \times 3} \\ &= \frac{3}{5} + \frac{2}{15} \\ &= \frac{3 \times 3}{5 \times 3} + \frac{2}{15} \\ &= \frac{9}{15} + \frac{2}{15} \\ &= \frac{9+2}{15} \\ &= \frac{11}{15} \end{aligned}$$

C.18

$$\begin{aligned} \text{a) } 2 + \frac{12}{15} \times \frac{10}{3} &= 2 + \frac{4 \times 3}{5 \times 3} \times \frac{5 \times 2}{3} \\ &= 2 + \frac{8}{3} \\ &= \frac{6}{3} + \frac{8}{3} \\ &= \frac{14}{3} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{15}{12} \times \frac{6}{10} - \frac{1}{8} &= \frac{5 \times 3}{6 \times 2} \times \frac{6}{5 \times 2} - \frac{1}{8} \\ &= \frac{3}{4} - \frac{1}{8} \\ &= \frac{6}{8} - \frac{1}{8} \\ &= \frac{5}{8} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{8}{3} - \frac{3}{8} \times \frac{10}{6} &= \frac{8}{3} - \frac{3 \times 10}{8 \times 6} \\ &= \frac{8}{3} - \frac{3 \times 2 \times 5}{2 \times 4 \times 2 \times 3} \\ &= \frac{8}{3} - \frac{3 \times 2 \times 5}{2 \times 4 \times 2 \times 3} \\ &= \frac{8}{3} - \frac{5}{4 \times 2} \\ &= \frac{8}{3} - \frac{5}{8} \\ &= \frac{8 \times 8}{3 \times 8} - \frac{5 \times 3}{8 \times 3} \\ &= \frac{64}{24} - \frac{15}{24} \\ &= \frac{64-15}{24} \\ &= \frac{49}{24} \end{aligned}$$

C.19



$\begin{aligned} \text{a) } \frac{1}{2} + 3 \times \frac{5}{2} &= \frac{1}{2} + \frac{3 \times 5}{2} \\ &= \frac{1}{2} + \frac{15}{2} \\ &= \frac{16}{2} \\ &= 8 \end{aligned}$	$\begin{aligned} \text{b) } \frac{1}{3} \times \frac{2}{4} + 1 &= \frac{1 \times 2}{3 \times 4} + 1 \\ &= \frac{2}{12} + 1 \\ &= \frac{1}{6} + 1 \\ &= \frac{1}{6} + \frac{6}{6} \\ &= \frac{7}{6} \end{aligned}$	$\begin{aligned} \text{c) } \left(\frac{1}{6} - \frac{1}{12}\right) \times 2 &= \left(\frac{2}{12} - \frac{1}{12}\right) \times 2 \\ &= \frac{1}{12} \times 2 \\ &= \frac{1 \times 2}{12} \\ &= \frac{1}{6} \end{aligned}$
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C.20

$\begin{aligned} \text{a) } \left(3 - \frac{5}{3}\right) \times \frac{5}{2+2} &= \left(\frac{9}{3} - \frac{5}{3}\right) \times \frac{5}{4} \\ &= \frac{4}{3} \times \frac{5}{4} \\ &= \frac{20}{12} \\ &= \frac{4 \times 5}{4 \times 3} \\ &= \frac{5}{3} \end{aligned}$	$\begin{aligned} \text{b) } \left(\frac{2}{3} + 1\right) \times \left(\frac{1}{2} + \frac{1}{4}\right) &= \left(\frac{2}{3} + \frac{3}{3}\right) \times \left(\frac{1 \times 2}{2 \times 2} + \frac{1}{4}\right) \\ &= \left(\frac{2+3}{3}\right) \times \left(\frac{2+1}{4}\right) \\ &= \frac{5}{3} \times \frac{3}{4} \\ &= \frac{5 \times 3}{3 \times 4} \\ &= \frac{5}{4} \end{aligned}$
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C.21

$\begin{aligned} \text{a) } 1 - \frac{-15}{7} \times \frac{14}{25} &= 1 - \frac{-5 \times 3 \times 7 \times 2}{7 \times 5 \times 5} \\ &= 1 - \frac{-1 \times 3 \times 1 \times 2}{1 \times 1 \times 5} \\ &= 1 - \frac{-6}{5} \\ &= \frac{5}{5} - \frac{-6}{5} \\ &= \frac{5 - (-6)}{5} \\ &= \frac{5 + 6}{5} \\ &= \frac{11}{5} \end{aligned}$	$\begin{aligned} \text{b) } \frac{4}{15} - \frac{24}{72} \times \frac{30}{20} &= \frac{4}{15} - \frac{24 \times 10 \times 3}{24 \times 3 \times 10 \times 2} \\ &= \frac{4}{15} - \frac{1 \times 1 \times 1}{1 \times 1 \times 1 \times 2} \\ &= \frac{4}{15} - \frac{1}{2} \\ &= \frac{8}{30} - \frac{15}{30} \\ &= \frac{8 - 15}{30} \\ &= \frac{-7}{30} \\ &= -\frac{7}{30} \end{aligned}$
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$$\begin{aligned} \text{c) } \frac{3}{4} \times \frac{-8}{12} + \frac{3}{4} &= \frac{3 \times (-8)}{4 \times 12} + \frac{3}{4} = \frac{-3 \times 4 \times 2}{4 \times 3 \times 2 \times 2} + \frac{3}{4} \\ &= \frac{-1}{2} + \frac{3}{4} = \frac{-2}{4} + \frac{3}{4} = \frac{-2+3}{4} + \frac{3}{4} = \frac{1}{4} \end{aligned}$$

C.22

$\begin{aligned} \text{a) } \left(\frac{2}{12} - \frac{3}{15}\right) \times \frac{20}{6} &= \left(\frac{10}{60} - \frac{12}{60}\right) \times \frac{10 \times 2}{3 \times 2} \\ &= \frac{10 - 12}{60} \times \frac{10}{3} \\ &= \frac{-2}{60} \times \frac{10}{3} \\ &= \frac{-2}{3 \times 10 \times 2} \times \frac{10}{3} \\ &= \frac{-1}{3 \times 3} \\ &= \frac{-1}{9} \\ &= -\frac{1}{9} \end{aligned}$	$\begin{aligned} \text{b) } \frac{3}{20} - \left(\frac{3}{15}\right) \times \frac{-5}{9} &= \left(\frac{3}{20} - \frac{1}{5}\right) \times \frac{-5}{9} \\ &= \left(\frac{3}{20} - \frac{4}{20}\right) \times \frac{-5}{9} \\ &= \frac{-1}{20} \times \frac{-5}{9} \\ &= \frac{1 \times 5}{5 \times 4 \times 9} \\ &= \frac{1 \times 1}{1 \times 4 \times 9} \\ &= \frac{1}{36} \end{aligned}$	$\begin{aligned} \text{c) } \frac{1}{6} - \left(\frac{5}{12} - \frac{2}{3}\right) &= \frac{1}{6} - \left(\frac{5}{12} - \frac{8}{12}\right) \\ &= \frac{1}{6} - \left(\frac{5-8}{12}\right) \\ &= \frac{1}{6} - \left(\frac{-3}{12}\right) \\ &= \frac{1}{6} - \left(-\frac{3}{12}\right) \\ &= \frac{1}{6} + \frac{3}{12} \\ &= \frac{2}{12} + \frac{3}{12} \\ &= \frac{5}{12} \end{aligned}$
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C.23

$\begin{aligned} \text{3a) } \left(\frac{5}{4} - \frac{15}{14}\right) - \frac{3}{8} &= 3 \times \left(\frac{35}{28} - \frac{30}{28}\right) - \frac{3}{8} \\ &= 3 \times \frac{35 - 30}{28} - \frac{3}{8} \\ &= 3 \times \frac{5}{28} - \frac{3}{8} \\ &= \frac{15}{28} - \frac{3}{8} \\ &= \frac{30}{56} - \frac{21}{56} \\ &= \frac{30 - 21}{56} \\ &= \frac{9}{56} \end{aligned}$	$\begin{aligned} \text{b) } \left(2 + \frac{1}{2}\right) \times \left(\frac{1}{2} - \frac{5}{4}\right) &= \left(\frac{-4}{2} + \frac{1}{2}\right) \times \left(\frac{2}{4} - \frac{5}{4}\right) \\ &= \frac{-3}{2} \times \frac{-3}{4} \\ &= \frac{3 \times 3}{2 \times 4} \\ &= \frac{9}{8} \end{aligned}$
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C.24

1 a) $4 \times \frac{5}{4} = 5$ b) $7 \times \frac{3}{7} = 3$ c) $3 \times \frac{1}{3} = 1$

2 a) Prop. 3: $\frac{2}{3} \times \frac{3}{2} = \frac{2}{3} \times \frac{3}{2} = \frac{1}{1} \times \frac{1}{1} = 1$

b) Prop. 1: $\frac{3}{15} \times 5 = \frac{15}{15} = 1$

c) Prop. 1: $\frac{2}{3} \times 1,5 = \frac{2 \times 1,5}{3} = \frac{3}{3} = 1$

d) Prop. 3:
On a: $\frac{2}{3} + \frac{1}{4} = \frac{8}{12} + \frac{3}{12} = \frac{11}{12}$

La proposition est 3.: $\left(\frac{2}{3} + \frac{1}{4}\right) \cdot \frac{12}{11} = \frac{12}{11} \cdot \frac{11}{12} = 1$

3 a) L'inverse de 3 est $\frac{1}{3}$.

b) L'inverse de -3 est $-\frac{1}{3}$.

c) On a $0,25 = \frac{1}{4}$. Ainsi, l'inverse de 0,25 est 4.

d) L'inverse de $\frac{2}{7}$ est $\frac{7}{2}$.

e) L'inverse de $-\frac{11}{3}$ est $-\frac{3}{11}$.



f) On a $1+0,5=1,5=\frac{3}{2}$. L'inverse de $1+0,5$ est $\frac{2}{3}$.

C.25

- a) L'inverse du nombre $\frac{1}{2}$ est 2.
- b) L'inverse du nombre $\frac{5}{4}$ est 0,8.
- c) L'inverse du nombre $\frac{2}{7}$ est 3,5.
- d) L'inverse de $\frac{3}{5}$ n'admet pas d'écriture décimale.
- e) L'inverse de -1 est -1 .
- f) L'inverse de $1,5$ n'admet pas d'écriture décimale.
- g) L'inverse de $0,2$ est 5.
- h) L'inverse de $0,75$ n'admet pas d'écriture décimale.
- j) L'inverse de $0,1$ est 10.
- k) L'inverse de $3,25$ n'admet pas d'écriture décimale.

C.26

<p>a) $\frac{8}{3} \div \frac{12}{3}$</p> $= \frac{\cancel{4} \times 2}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{4} \times 3}$ $= \frac{2 \times 1}{1 \times 3}$ $= \frac{2}{3}$	<p>b) $\frac{18}{3} \div 9$</p> $= \frac{\cancel{9} \times 2}{\cancel{3}} \times \frac{1}{\cancel{9}}$ $= \frac{2}{3}$	<p>c) $3 \div \frac{4}{6}$</p> $= 3 \times \frac{3 \times \cancel{2}}{2 \times \cancel{2}}$ $= 3 \times \frac{3}{2}$ $= \frac{9}{2}$
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C.27

<p>a) $\frac{7}{3} \div \frac{14}{3}$</p> $= \frac{7}{\cancel{3}} \times \frac{\cancel{3}}{14}$ $= \frac{\cancel{7}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{7} \times 2}$ $= \frac{1}{2}$	<p>b) $\frac{15}{3} \div 5$</p> $= \frac{15}{\cancel{3}} \times \frac{1}{\cancel{5}}$ $= \frac{\cancel{5} \times 3}{\cancel{3}} \times \frac{1}{\cancel{5}}$ $= \frac{\cancel{3}}{\cancel{3}}$ $= 1$	<p>c) $\frac{15}{6} \div \frac{100}{18}$</p> $= \frac{15}{\cancel{6}} \times \frac{18}{100}$ $= \frac{\cancel{5} \times 3}{\cancel{6}} \times \frac{\cancel{6} \times 3}{\cancel{5} \times 20}$ $= \frac{3}{1} \times \frac{3}{20}$ $= \frac{9}{20}$
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C.28

<p>a) $\frac{3}{4} \div \frac{1}{7}$</p> $= \frac{3}{\cancel{4}} \times \frac{\cancel{7}}{\cancel{7}}$ $= \frac{3}{28}$	<p>b) $\frac{3}{2} \div \frac{3}{2}$</p> $= 3 \times \frac{3}{2}$ $= \frac{9}{2}$	<p>c) $\frac{2}{5} \div \frac{3}{5}$</p> $= \frac{2}{\cancel{5}} \times \frac{\cancel{5}}{\cancel{3}}$ $= \frac{2}{3}$
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C.29

<p>a) $\frac{4}{\frac{12}{20}}$</p> $= \frac{4}{12} \times \frac{3}{20}$ $= \frac{\cancel{4} \times \cancel{3}}{\cancel{4} \times \cancel{3} \times 5 \times 4}$ $= \frac{1 \times 1}{4 \times 5}$ $= \frac{1}{20}$	<p>b) $\frac{14}{\frac{26}{28}}$</p> $= \frac{14}{26} \times \frac{39}{28}$ $= \frac{\cancel{14}}{\cancel{13} \times 2} \times \frac{\cancel{13} \times 3}{\cancel{14} \times 2}$ $= \frac{1}{2} \times \frac{3}{2}$ $= \frac{3}{4}$	<p>c) $\frac{25}{\frac{16}{15}}$</p> $= \frac{25}{16} \times \frac{1}{15}$ $= \frac{\cancel{5} \times 5}{16} \times \frac{1}{\cancel{5} \times 3}$ $= \frac{5}{16} \times \frac{1}{3}$ $= \frac{5}{48}$
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C.30

<p>a) $(\frac{5}{3} + \frac{4}{3}) \div (\frac{3}{5} - \frac{3}{7})$</p> $= \frac{9}{3} \div (\frac{21}{35} - \frac{15}{35})$ $= \frac{9}{3} \div \frac{21-15}{35}$ $= \frac{9}{3} \div \frac{6}{35}$ $= \frac{9}{3} \times \frac{35}{6}$ $= 3 \times \frac{35}{6}$ $= \frac{35}{2}$	<p>b) $\frac{14}{5} \div (\frac{8}{5} + 4)$</p> $= \frac{14}{5} \div (\frac{8}{5} + \frac{20}{5})$ $= \frac{14}{5} \div (\frac{8+20}{5})$ $= \frac{14}{5} \div \frac{28}{5}$ $= \frac{14}{5} \times \frac{5}{14 \times 2}$ $= \frac{1}{2}$
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C.31

<p>a) $\frac{3 - \frac{1}{4}}{-3 + \frac{1}{8}}$</p> $= \frac{\frac{12}{4} - \frac{1}{4}}{\frac{-24}{8} + \frac{1}{8}}$ $= \frac{\frac{11}{4}}{\frac{-23}{8}}$ $= \frac{11}{4} \times \frac{8}{-23}$ $= \frac{11}{\cancel{4}} \times \frac{\cancel{4} \times 2}{-23}$ $= -\frac{22}{23}$	<p>b) $\frac{\frac{5}{2} - \frac{3}{3}}{7 + \frac{14}{14}}$</p> $= \frac{\frac{5}{2} - \frac{2}{6}}{\frac{14}{14} + \frac{14}{14}}$ $= \frac{\frac{3}{2}}{\frac{6}{4} + 3}$ $= \frac{\frac{3}{2}}{\frac{6}{4} + \frac{12}{4}}$ $= \frac{3}{6} \times \frac{14}{7}$ $= \frac{3}{6} \times 2$ $= \frac{6}{6}$ $= 1$	<p>c) $\frac{\frac{1}{2} + 2}{\frac{1}{3} + \frac{4}{3}}$</p> $= \frac{\frac{1}{2} + \frac{4}{2}}{\frac{1}{3} + \frac{4}{3}}$ $= \frac{\frac{5}{2}}{\frac{5}{3}}$ $= \frac{5}{2} \times \frac{3}{5}$ $= \frac{\cancel{5}}{2} \times \frac{3}{\cancel{5}}$ $= \frac{3}{2}$
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C.32

- 1) ● Le calcul A donne pour résultat $\frac{1}{3}$.
- Le calcul B donne pour résultat $\frac{5}{12}$.
- 2) Voici les deux expressions symbolisant ces deux calculs :



• Pour le calcul A : $\frac{\frac{4}{5} - \frac{2}{3}}{\frac{2}{5}}$

• Pour le calcul B : $\left(\frac{1}{\frac{3}{2}} - 1\right) \times \frac{5}{2}$

