

## Les fractions

### La méthode

Pour additionner deux fractions on les réduit au même dénominateur ; on additionne alors les numérateurs obtenus.

On rappelle que :  $\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$  et  $\frac{a}{b} + \frac{c}{d} = \frac{a.d + b.c}{b.d}$

Par exemple :

Le dénominateur commun à 6 et 4 est 12.  
En effet :

$$6 = \textcircled{2} \times 3 \longrightarrow 12$$

$$4 = \textcircled{2} \times 2 \longrightarrow 12$$

$$\begin{aligned} \frac{7}{6} + \frac{3}{4} &= \frac{14}{12} + \frac{9}{12} \\ &= \frac{14+9}{12} \\ &= \frac{23}{12} \end{aligned}$$

Compléter les suites de calculs :

$$\begin{aligned} \frac{5}{12} + \frac{3}{8} &= \frac{5 \times 2}{24} + \frac{3 \times 3}{24} \\ &= \frac{10}{24} + \frac{9}{24} \\ &= \frac{19}{24} \end{aligned}$$

$$\begin{aligned} \frac{15}{16} + \frac{5}{12} + \frac{11}{9} &= \frac{9 \times 15}{144} + \frac{5 \times 12}{144} + \frac{16 \times 11}{144} \\ &= \frac{135}{144} + \frac{60}{144} + \frac{165}{144} \\ &= \frac{371}{144} \end{aligned}$$

### L'entraînement :

En procédant suivant la méthode, donnez les résultats sous forme de fractions irréductibles ( sous forme la plus simple)

Rappels :

- les calculs doivent être posés en colonne
- Les résultats doivent être soulignés ou encadrés à la règle

A-  $a = 3 + \frac{1}{5} + \frac{1}{4}$

$$\begin{aligned} &= \frac{3 \times 20}{20} + \frac{4 \times 1}{20} + \frac{5 \times 1}{20} \\ &= \frac{60}{20} + \frac{4}{20} + \frac{5}{20} \end{aligned}$$

$$a = \frac{69}{20}$$

$b = 2 - \frac{1}{5} - \frac{3}{15}$

$$\begin{aligned} &= \frac{2 \times 15}{15} - \frac{3}{15} - \frac{3}{15} \\ &= \frac{30}{15} - \frac{3}{15} - \frac{3}{15} \end{aligned}$$

$$b = \frac{8}{5}$$

$c = \frac{1}{3} - \frac{1}{5}$

$$\begin{aligned} &= \frac{5 \times 1}{15} - \frac{3 \times 1}{15} \\ &= \frac{5}{15} - \frac{3}{15} \end{aligned}$$

$$c = \frac{2}{15}$$

$$\begin{aligned} \text{B- } d &= 2\left(\frac{1}{4} - \frac{1}{8}\right) \\ &= 2\left(\frac{2}{8} - \frac{1}{8}\right) \\ &= 2\left(\frac{1}{8}\right) \end{aligned}$$

$$\boxed{d = \frac{1}{4}}$$

$$\begin{aligned} e &= -3\left(\frac{1}{3} - \frac{1}{6}\right) \\ &= -3\left(\frac{2}{6} - \frac{1}{6}\right) \\ &= -3\left(\frac{1}{6}\right) \end{aligned}$$

$$\boxed{e = -\frac{1}{2}}$$

$$\begin{aligned} \text{C- } f &= \left(\frac{1}{5} + \frac{1}{10}\right) \times \left(\frac{1}{2} + \frac{1}{4}\right) \\ &= \left(\frac{2}{10} + \frac{1}{10}\right) \times \left(\frac{2}{4} + \frac{1}{4}\right) \\ &= \frac{3}{10} \times \frac{3}{4} \end{aligned}$$

$$\boxed{f = \frac{9}{40}}$$

$$\begin{aligned} g &= \left(\frac{3}{5} + \frac{1}{4}\right) \times \left(\frac{2}{3} - \frac{3}{4}\right) \\ &= \left(\frac{12}{20} + \frac{5}{20}\right) \times \left(\frac{8}{12} - \frac{9}{12}\right) \\ &= \frac{17}{20} \times \left(-\frac{1}{12}\right) \end{aligned}$$

$$\boxed{g = \frac{-17}{240}}$$

$$\begin{aligned} \text{D- } h &= \left(\frac{2}{3} - \frac{1}{8}\right) \times \left(\frac{4}{5} - \frac{3}{8}\right) \\ &= \left(\frac{16}{24} - \frac{3}{24}\right) \times \left(\frac{32}{40} - \frac{15}{40}\right) \\ &= \frac{13}{24} \times \frac{17}{40} \end{aligned}$$

$$\boxed{h = \frac{221}{960}}$$

$$\begin{aligned} i &= 3\left(\frac{2}{5} - \frac{1}{4}\right) \times \left(\frac{7}{6} - \frac{3}{12}\right) \\ &= 3\left(\frac{8}{20} - \frac{5}{20}\right) \times \left(\frac{14}{12} - \frac{3}{12}\right) \\ &= 3 \times \frac{3}{20} \times \frac{11}{12} \end{aligned}$$

$$\boxed{i = \frac{33}{80}}$$

$$\begin{aligned} \text{E- } j &= \frac{3}{4} \\ &= 3 \times \frac{5}{4} \end{aligned}$$

$$\boxed{j = \frac{15}{4}}$$

$$\begin{aligned} k &= \frac{4}{3} \\ &= 4 \times \frac{5}{3} \end{aligned}$$

$$\boxed{k = \frac{20}{3}}$$

$$\begin{aligned} l &= \frac{3}{5} \\ &= 3 \times \frac{2}{5} \end{aligned}$$

$$\boxed{l = \frac{6}{5}}$$

$$\begin{aligned} \text{F- } m &= \frac{3}{8} \\ &= \frac{3}{8} \times \frac{1}{5} \end{aligned}$$

$$\boxed{m = \frac{3}{40}}$$

$$\begin{aligned} n &= \frac{8}{3} \\ &= \frac{8}{3} \times \frac{1}{5} \end{aligned}$$

$$\boxed{n = \frac{8}{15}}$$

$$\begin{aligned} o &= \frac{5}{10} \\ &= \frac{1}{2} \times \frac{5}{4} \end{aligned}$$

$$\boxed{o = \frac{5}{8}}$$

$$\begin{aligned} \text{G- } p &= \frac{3}{4} \div \frac{3}{5} \\ &= \frac{3}{4} \times \frac{5}{3} \end{aligned}$$

$$\boxed{p = \frac{5}{4}}$$

$$\begin{aligned} q &= \frac{5}{8} \div \frac{4}{5} \\ &= \frac{5}{8} \times \frac{5}{4} \end{aligned}$$

$$\boxed{q = \frac{25}{32}}$$

$$\begin{aligned} r &= \frac{3}{11} \div \frac{1}{33} \\ &= \frac{3}{11} \times 33 \end{aligned}$$

$$\boxed{r = 9}$$

$$\begin{aligned} \text{H- } s &= \left(\frac{3}{5} + \frac{4}{15}\right) \div \left(\frac{5}{9} + \frac{3}{18}\right) \\ &= \left(\frac{9}{15} + \frac{4}{15}\right) \div \left(\frac{10}{18} + \frac{3}{18}\right) \\ &= \left(\frac{13}{15}\right) \div \left(\frac{13}{18}\right) \\ &= \frac{13}{15} \times \frac{18}{13} \end{aligned}$$

$$\boxed{s = \frac{6}{5}}$$

$$\begin{aligned} t &= \left(2 + \frac{1}{3}\right) \div \left(5 + \frac{1}{5}\right) \\ &= \left(\frac{6}{3} + \frac{1}{3}\right) \div \left(\frac{25}{5} + \frac{1}{5}\right) \\ &= \left(\frac{7}{3}\right) \div \left(\frac{26}{5}\right) \\ &= \frac{7}{3} \times \frac{5}{26} \end{aligned}$$

$$\boxed{t = \frac{35}{78}}$$

### Le perfectionnement

1-Ecrire les nombres suivants sous forme de fractions irréductibles :

$$\begin{aligned} \text{A} &= \frac{5 + \frac{3}{4} - \frac{1}{3}}{5 - \frac{3}{4} + \frac{1}{3}} \\ &= \frac{\frac{60 + 9 - 4}{12}}{\frac{60 - 9 + 4}{12}} \end{aligned}$$

$$\begin{aligned} &= \frac{65}{12} \\ &= \frac{55}{12} \\ &= \frac{65}{12} \times \frac{12}{55} \end{aligned}$$

$$\boxed{\text{A} = \frac{13}{11}}$$

$$\begin{aligned} \text{B} &= \frac{150}{71} \times \frac{13}{58} \\ &= \frac{150}{71} \times \frac{9}{29} \times \frac{13}{58} \times \frac{71}{38} \end{aligned}$$

$$\begin{aligned} &= \frac{3 \times 5 \times 2 \times 5 \times 3 \times 3 \times 13 \times 71}{71 \times 29 \times 2 \times 29 \times 2 \times 19} \\ &= \frac{3^3 \times 5^2 \times 13}{29^2 \times 2 \times 19} \end{aligned}$$

$$\boxed{\text{B} = \frac{8775}{31958}}$$

$$\begin{aligned} \text{C} &= \frac{14^2 \times 121^2}{55^2 \times 49} \\ &= \frac{(2 \times 7)^2 \times (11^2)^2}{(5 \times 11)^2 \times 7^2} \end{aligned}$$

$$\begin{aligned} &= \frac{(2 \times 7)^2 \times (11^2)^2}{(5 \times 11)^2 \times 7^2} \\ &= \frac{2^2 \times 11^2}{5^2} \end{aligned}$$

$$\boxed{\text{C} = \frac{484}{25}}$$

$$D = \frac{5}{3} - \frac{4}{5} + \frac{2}{7} \times \frac{21}{3}$$

$$= \frac{5}{3} - \frac{4}{5} + 2$$

$$= \frac{25}{15} - \frac{12}{15} + \frac{30}{15}$$

$$\boxed{D = \frac{43}{15}}$$

$$E = \frac{\frac{71}{150}}{\frac{29}{9}} \times \frac{\frac{58}{19}}{\frac{71}{38}}$$

$$= \frac{71}{150} \times \frac{9}{29} \times \frac{58}{19} \times \frac{38}{71}$$

$$= \frac{71 \times 3 \times 3 \times 2 \times 29 \times 2 \times 19}{3 \times 5 \times 2 \times 5 \times 29 \times 19 \times 71}$$

$$\boxed{E = \frac{6}{25}}$$

$$F = \frac{3 - \frac{5}{7} + \frac{1}{2}}{3 + \frac{5}{7} - \frac{1}{2}}$$

$$= \frac{\frac{42}{14} - \frac{10}{14} + \frac{7}{14}}{\frac{42}{14} + \frac{10}{14} - \frac{7}{14}}$$

$$= \frac{39}{14} = \frac{14}{45} = \frac{14}{14}$$

$$\boxed{F = \frac{13}{15}}$$

$$G = \frac{3}{7} \times \frac{14}{2} \times \frac{(-11)}{8} \times (-5) \times \frac{44}{55} \times \frac{2}{3}$$

$$G = \frac{3 \times 2 \times 7 \times 11 \times 5 \times 2 \times 2 \times 11 \times 2}{7 \times 2 \times 2 \times 2 \times 2 \times 5 \times 11 \times 3}$$

$$G = \frac{3 \times 2 \times 7 \times 11 \times 5 \times 2 \times 2 \times 11 \times 2}{7 \times 2 \times 2 \times 2 \times 2 \times 5 \times 11 \times 3}$$

$$\boxed{G = 11}$$

2- Simplifiez les expressions suivantes :

$$H = \frac{4}{3} + \frac{5}{4}$$

$$H = \frac{16}{12} + \frac{15}{12}$$

$$\boxed{H = \frac{31}{12}}$$

$$I = \frac{7}{8} \times \frac{6}{13}$$

$$I = \frac{7 \times 2 \times 3}{2 \times 2 \times 2 \times 13}$$

$$\boxed{I = \frac{21}{52}}$$

$$J = 2 \times \left(3 + \frac{1}{4}\right)$$

$$J = 2 \times \left(\frac{12}{4} + \frac{1}{4}\right)$$

$$J = 2 \times \frac{13}{4}$$

$$\boxed{J = \frac{13}{2}}$$

$$K = \frac{1}{2} \times \frac{5}{6} \times 9$$

$$K = \frac{5 \times 3 \times 3}{2 \times 2 \times 3}$$

$$\boxed{K = \frac{15}{4}}$$

$$L = \frac{6}{\frac{35}{3}}$$

$$L = \frac{6}{35} \times \frac{1}{3}$$

$$\boxed{L = \frac{2}{35}}$$

$$M = \frac{6}{\frac{35}{3}}$$

$$M = 6 \times \frac{3}{35}$$

$$\boxed{M = \frac{18}{35}}$$

$$N = \frac{9}{10} - \frac{1}{100}$$

$$N = \frac{90}{100} - \frac{1}{100}$$

$$\boxed{N = \frac{89}{100}}$$

$$O = \frac{7}{4} \div \frac{35}{26}$$

$$O = \frac{7}{4} \times \frac{26}{35}$$

$$\boxed{O = \frac{13}{10}}$$

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

$$Q = \frac{5}{6} + \frac{1}{4} - \frac{1}{3} - \frac{1}{12}$$

$$R = \frac{\frac{6}{35}}{\frac{3}{5}}$$

$$P = \frac{1}{\frac{3}{6} + \frac{1}{6}}$$

$$Q = \frac{10}{12} + \frac{3}{12} - \frac{4}{12} - \frac{1}{12}$$

$$R = \frac{6}{35} \times \frac{5}{3}$$

$$P = \frac{1}{\frac{4}{6}}$$

$$Q = \frac{2}{3}$$

$$R = \frac{2}{7}$$

$$P = \frac{3}{2}$$

3 – Calculer.

Effectuer les opérations suivantes et donner le résultat sous forme de fraction irréductible.

$$A = \frac{15}{39} \times \frac{26}{25} \times \frac{28}{42}$$

$$B = \frac{3 - \frac{2}{5} + \frac{4}{3}}{2 + \frac{4}{5} - \frac{2}{3}}$$

$$C = \frac{3 - \frac{5}{7} + \frac{1}{2}}{3 + \frac{5}{7} - \frac{1}{2}} + \frac{5 + \frac{3}{4} - \frac{1}{3}}{5 - \frac{3}{4} + \frac{1}{3}}$$

$$A = \frac{3 \times 5 \times 2 \times 13 \times 2 \times 2 \times 7}{3 \times 13 \times 5 \times 5 \times 2 \times 3 \times 7}$$

$$B = \frac{\frac{45}{15} - \frac{6}{15} + \frac{20}{15}}{\frac{30}{15} + \frac{12}{15} - \frac{10}{15}}$$

$$C = \frac{\frac{42}{14} - \frac{10}{14} + \frac{7}{14}}{\frac{42}{14} + \frac{10}{14} - \frac{7}{14}} + \frac{\frac{60 + 9 - 4}{12}}{\frac{60 - 9 + 4}{12}}$$

$$A = \frac{4}{15}$$

$$B = \frac{59}{32}$$

$$C = \frac{13}{15} + \frac{13}{11}$$

$$C = \frac{143}{165} + \frac{195}{165}$$

$$C = \frac{338}{165}$$