corrigé niveau 1

1 Préliminaires

Exercice 1 : $\frac{2016}{2} = 1008$; $\frac{1008}{2} = 504$; $\frac{504}{0} = 252$; $\frac{252}{2} = 126$; $\frac{126}{2} = 63$; $\frac{63}{3} = 21$; $\frac{21}{3} = 7$.

Donc $2016 = 2^5 \times 3^2 \times 7$

Exercice 2 à 10 : $756 = 2^2 \times 3^3 \times 7$; $1350 = 2 \times 3^3 \times 5^2$; $1485 = 3^3 \times 5 \times 11$; $2048 = 2^{11}$; $2310 = 2 \times 3 \times 5 \times 7 \times 11$; $243 = 3^5$

71 est premier car 2 ; 3 ; 5 et 7 ne divisent pas 71 et $9^2 > 71$

$3125 = 5^5$; 79 est premier.

2 Simplification des fractions d'entiers

Exercice 1 : $\frac{2016}{756} = \frac{2^5 \times 3^2 \times 7}{2^2 \times 3^2 \times 7} = \frac{2^5}{2^2} = 2^3 = 8$.

Exercices 2 à 7 : $\frac{3}{6} = \frac{1}{2}$; $\frac{2048}{64} = \frac{2^{11}}{2^6} = 2^5 = 32$; $\frac{1485}{2310} = \frac{9}{14}$; $\frac{1350}{243} = \frac{50}{9}$; $\frac{17}{32} = \frac{17}{32}$; $\frac{756}{1350} = \frac{14}{25}$

3 Produits et quotients de fractions

Exercice 1 : $\frac{3}{5} \times \frac{15}{7} = \frac{3 \times 15}{5 \times 7} = \frac{3 \times 3 \times 5}{5 \times 7} = \frac{9}{7}$ et $\frac{\frac{3}{5}}{\frac{15}{7}} = \frac{3}{5} \times \frac{7}{15} = \frac{3 \times 7}{5 \times 15} = \frac{3 \times 7}{5 \times 3 \times 5} = \frac{7}{25}$

Exercice 2 : $3 \times \frac{15}{7} = \frac{3 \times 15}{7} = \frac{45}{7}$ et $\frac{3}{\frac{15}{7}} = 3 \times \frac{7}{15} = \frac{3 \times 7}{15} = \frac{3 \times 7}{3 \times 5} = \frac{7}{5}$ et $\frac{\frac{15}{7}}{3} = \frac{15}{3 \times 7} = \frac{3 \times 5}{3 \times 7} = \frac{5}{7}$

Exercices 3 à 10 : $\frac{6}{15} \times \frac{5}{7} = \frac{2}{7}$; $\frac{\frac{6}{15}}{\frac{14}{5}} = \frac{1}{7}$; $7 \times \frac{5}{14} = \frac{5}{2}$; $\frac{2}{\frac{5}{14}} = \frac{28}{5}$; $\frac{\frac{2}{5}}{14} = \frac{1}{35}$; $3 \times \frac{3}{4} = \frac{9}{4}$; $\frac{\frac{17}{32}}{\frac{1}{4}} = \frac{17}{8}$.

$\frac{1485}{2310} \times \frac{1350}{243} = \frac{9}{14} \times \frac{50}{9} = \frac{25}{7}$

4 Sommes et différences de fractions

Exercice 1 : $\frac{3}{2} + \frac{2}{3} = \frac{3 \times 3}{2 \times 3} + \frac{2 \times 2}{3 \times 2} = \frac{9}{6} + \frac{4}{6} = \frac{13}{6}$

Exercice 2 : $3 + \frac{2}{3} = \frac{3}{1} + \frac{2}{3} = \frac{9}{3} + \frac{2}{3} = \frac{11}{3}$

Exercices 3 à 10 : $\frac{4}{5} - \frac{2}{3} = \frac{2}{15}$; $\frac{5}{4} - \frac{3}{2} = \frac{5}{4} - \frac{6}{4} = -\frac{1}{4}$; $\frac{1}{3} + \frac{1}{6} = \frac{1}{2}$; $5 - \frac{11}{2} = -\frac{1}{2}$

$\frac{1}{2} + \frac{2}{3} + \frac{3}{5} = \frac{1 \times 3 \times 5}{2 \times 3 \times 5} + \frac{2 \times 2 \times 5}{3 \times 2 \times 5} + \frac{3 \times 2 \times 3}{5 \times 2 \times 3} = \frac{15+20+18}{30} = \frac{53}{30}$

$3 + \frac{5}{2} - \frac{2}{3} = \frac{3 \times 6}{6} + \frac{5 \times 3}{6} - \frac{2 \times 2}{6} = \frac{18+15+4}{6} = \frac{37}{6}$

$\frac{3}{5} \times \left(\frac{7}{2} + \frac{7}{3}\right) = \frac{3}{5} \times \left(\frac{7 \times 3}{6} + \frac{7 \times 2}{6}\right) = \frac{3}{5} \times \frac{35}{6} = \frac{7}{2}$

$\frac{\frac{5}{3}}{\frac{7}{2} + \frac{7}{3}} = \frac{\frac{5}{3}}{\frac{35}{6}} = \frac{5 \times 6}{3 \times 35} = \frac{2}{7}$