

CORRIGE – M. QUET

EXERCICE 1.1 Ecrire sous la forme d'une fraction irréductible :

$$A = \frac{8}{12} = \frac{\boxed{4} \times 2}{\boxed{4} \times 3} = \frac{2}{3} \quad B = \frac{1}{3} + \frac{1}{2} = \frac{1 \times 2}{3 \times 2} + \frac{1 \times 3}{2 \times 3} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6} \quad C = \frac{2}{3} + \frac{5}{6} = \frac{2 \times 2}{3 \times 2} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \frac{9}{6} = \frac{\boxed{3} \times 3}{\boxed{3} \times 2} = \frac{3}{2}$$

$$D = \frac{2}{5} - 1 = \frac{2}{5} - \frac{5}{5} = -\frac{3}{5} \quad E = \frac{5}{4} - \frac{7}{6} = \frac{5 \times 3}{4 \times 3} - \frac{7 \times 2}{6 \times 2} = \frac{15}{12} - \frac{14}{12} = \frac{1}{12}$$

$$F = \frac{1}{15} + \frac{1}{3} - \frac{3}{20} = \frac{1 \times 4}{15 \times 4} + \frac{1 \times 20}{3 \times 20} - \frac{3 \times 3}{20 \times 3} = \frac{4}{60} + \frac{20}{60} - \frac{9}{60} = \frac{15}{60} = \frac{\boxed{15} \times 1}{\boxed{15} \times 4} = \frac{1}{4}$$

EXERCICE 1.2 Ecrire sous la forme d'une fraction, la plus simple possible :

$$A = \frac{1}{a} + \frac{1}{b} = \frac{1 \times b}{a \times b} + \frac{1 \times a}{b \times a} = \frac{b}{ab} + \frac{a}{ba} = \frac{a+b}{ab} \quad B = \frac{3}{2a} + \frac{5}{b} = \frac{3 \times b}{2a \times b} + \frac{5 \times 2a}{b \times 2a} = \frac{3b}{2ab} + \frac{10a}{2ba} = \frac{10a+3b}{2ab}$$

$$C = \frac{3}{2a} - \frac{1}{ab} = \frac{3 \times ab}{2a \times ab} - \frac{1 \times 2a}{ab \times 2a} = \frac{3ab}{2a^2b} - \frac{2a}{2a^2b} = \frac{3ab-2a}{2a^2b}$$

$$D = \frac{1}{2a} + \frac{1}{6a} + \frac{1}{15a} = \frac{1 \times 15}{2a \times 15} + \frac{1 \times 5}{6a \times 5} + \frac{1 \times 2}{15a \times 2} = \frac{15}{30a} + \frac{5}{30a} + \frac{2}{30a} = \frac{22}{30a} = \frac{\boxed{2} \times 11}{\boxed{2} \times 15a} = \frac{11}{15a}$$

$$E = \frac{1}{a} + \frac{1}{a^2} + \frac{1}{a^3} = \frac{1 \times a^2}{a \times a^2} + \frac{1 \times a}{a^2 \times a} + \frac{1}{a^3} = \frac{a^2}{a^3} + \frac{a}{a^3} + \frac{1}{a^3} = \frac{a^2+a+1}{a^3}$$

$$F = \frac{2}{ab} + \frac{3}{a^2} + \frac{4}{b^2} = \frac{2 \times ab}{ab \times ab} + \frac{3 \times b^2}{a^2 \times b^2} + \frac{4 \times a^2}{b^2 \times a^2} = \frac{2ab}{a^2b^2} + \frac{3b^2}{a^2b^2} + \frac{4a^2}{a^2b^2} = \frac{2ab+3b^2+4a^2}{a^2b^2}$$

EXERCICE 1.3 Ecrire sous la forme d'une fraction irréductible :

$$A = \frac{4}{3} \times \frac{7}{5} = \frac{4 \times 7}{3 \times 5} = \frac{28}{15} \quad B = \frac{2}{5} \times \frac{5}{9} = \frac{2 \times \boxed{5}}{\boxed{5} \times 9} = \frac{2}{9} \quad C = \frac{7}{8} \times \frac{6}{5} = \frac{7 \times 6}{8 \times 5} = \frac{7 \times 3 \times \boxed{2}}{\boxed{2} \times 4 \times 5} = \frac{21}{20}$$

$$D = \frac{-2}{5} \times \frac{3}{-7} \times \frac{-7}{2} = -\frac{\boxed{2} \times 3 \times \boxed{7}}{5 \times \boxed{7} \times \boxed{2}} = -\frac{3}{5} \quad E = 7 \times \frac{1}{11} \times \frac{3}{14} = \frac{7 \times 1 \times 3}{11 \times 14} = \frac{\boxed{7} \times 1 \times 3}{11 \times \boxed{7} \times 2} = \frac{3}{22}$$

$$F = \frac{6}{35} \times \frac{14}{3} \times \frac{1}{2} = \frac{6 \times 14 \times 1}{35 \times 3 \times 2} = \frac{\boxed{3} \times 2 \times \boxed{7} \times \boxed{2} \times 1}{\boxed{7} \times 5 \times \boxed{3} \times \boxed{2}} = \frac{2}{5}$$

$$G = \frac{51}{26} \times \frac{49}{15} \times \frac{65}{119} = \frac{51 \times 49 \times 65}{26 \times 15 \times 119} = \frac{\boxed{3} \times \boxed{17} \times \boxed{7} \times 7 \times \boxed{13} \times \boxed{5}}{\boxed{13} \times 2 \times \boxed{3} \times \boxed{5} \times \boxed{17} \times \boxed{7}} = \frac{7}{2}$$

$$H = \frac{2^3}{5^2} \times \frac{3^5}{2^7} \times \frac{5^3}{3^3} = \frac{2^3 \times 3^5 \times 5^3}{5^2 \times 2^7 \times 3^3} = \frac{3^2 \times 5^1}{2^4} = 3^2 \times 5 \times 2^{-4}$$

$$I = \frac{14^4 \times 6^3}{18^4 \times 49} = \frac{(7 \times 2)^4 \times (3 \times 2)^3}{(3^2 \times 2)^4 \times 7^2} = \frac{7^4 \times 2^4 \times 3^3 \times 2^3}{(3^2)^4 \times 2^4 \times 7^2} = \frac{7^4 \times 2^7 \times 3^3}{3^8 \times 2^4 \times 7^2} = \frac{7^2 \times 2^3}{3^5} = 7^2 \times 2^3 \times 3^{-5}$$

$$J = \frac{55^3 \times 26^2}{65^3 \times 44^2} = \frac{(11 \times 5)^3 \times (13 \times 2)^2}{(13 \times 5)^3 \times (11 \times 2^2)^2} = \frac{11^3 \times 5^3 \times 13^2 \times 2^2}{13^3 \times 5^3 \times 11^2 \times (2^2)^2} = \frac{11^1 \times \boxed{5^3} \times 2^2}{13^1 \times \boxed{5^3} \times 2^4} = \frac{11}{13 \times 2^2} = 11 \times 13^{-1} \times 2^{-2}$$

EXERCICE 1.4 Ecrire sous la forme d'une fraction irréductible :

$$A = \frac{2}{3} \div \frac{5}{7} = \frac{2}{3} \times \frac{7}{5} = \frac{2 \times 7}{3 \times 5} = \frac{14}{15} \quad B = \frac{1}{3} \div 5 = \frac{1}{3} \times \frac{1}{5} = \frac{1 \times 1}{3 \times 5} = \frac{1}{15}$$

$$C = -4 \div \frac{-2}{3} = -4 \times \frac{3}{-2} = +\frac{4 \times 3}{2} = \frac{2 \times \boxed{2} \times 3}{\boxed{2}} = 6 \quad D = \frac{2}{5} \div \frac{3}{5} = \frac{2}{5} \times \frac{5}{3} = \frac{2 \times \boxed{3}}{\boxed{3} \times 5} = \frac{2}{5}$$

$$E = \frac{3}{\frac{7}{2}} = 3 \times \frac{2}{7} = \frac{3 \times 2}{7} = \frac{6}{7}$$

$$F = -\frac{-12}{\frac{49}{-3}} = -\frac{-12}{49} \times \frac{-35}{-3} = \frac{12 \times 35}{49 \times 3} = \frac{\boxed{3} \times 4 \times \boxed{7} \times 5}{\boxed{7} \times 7 \times \boxed{3}} = \frac{20}{7}$$

EXERCICE 1.5 Ecrire sous la forme d'une fraction, la plus simple possible :

$$A = \frac{b^2}{a^5} \times \frac{a^7}{b^3} = \frac{b^2 \times a^7}{a^5 \times b^3} = \frac{a^2}{b^1} = a^2 \times b^{-1}$$

$$B = \frac{b^2}{a^5} \div \frac{a^7}{b^3} = \frac{b^2}{a^5} \times \frac{b^3}{a^7} = \frac{b^5}{a^{12}} = b^5 \times a^{-12}$$

$$C = \frac{a^3}{b^2} \times \frac{3a^2}{b} \times \frac{b^7}{2a^4} = \frac{a^3 \times 3a^2 \times b^7}{b^2 \times b \times 2a^4} = \frac{3a^5 b^7}{2a^4 b^3} = \frac{3ab^4}{2}$$

EXERCICE 1.6 Ecrire sous la forme d'une fraction irréductible :

$$A = \frac{2}{3} - \frac{4}{3} \times \frac{2}{5} = \frac{2}{3} - \frac{8}{15} = \frac{2 \times 5}{3 \times 5} - \frac{8}{15} = \frac{10}{15} - \frac{8}{15} = \frac{2}{15}$$

$$B = 1 + \frac{1}{\frac{1}{2}} = 1 + 1 \times \frac{2}{1} = 1 + 2 = 3$$

$$C = \frac{7}{3} \left(2 - \frac{11}{4} \right) = \frac{7}{3} \left(\frac{2 \times 4}{1 \times 4} - \frac{11}{4} \right) = \frac{7}{3} \left(\frac{8}{4} - \frac{11}{4} \right) = \frac{7}{3} \times \left(-\frac{3}{4} \right) = -\frac{7 \times \boxed{3}}{\boxed{3} \times 4} = -\frac{7}{4}$$

$$D = \frac{1 + \frac{1}{7}}{1 + \frac{1}{3}} = \frac{\frac{7}{7} + \frac{1}{7}}{\frac{3}{3} + \frac{1}{3}} = \frac{\frac{8}{7}}{\frac{4}{3}} = \frac{8}{7} \times \frac{3}{4} = \frac{8 \times 3}{7 \times 4} = \frac{\boxed{4} \times 2 \times 3}{7 \times \boxed{4}} = \frac{6}{7}$$

$$E = \frac{-3}{5} \times \frac{5}{\frac{-6}{13}} = \frac{-3}{5} \times 5 \times \frac{13}{-6} = +\frac{\boxed{3} \times \boxed{5} \times 13}{\boxed{5} \times 2 \times \boxed{3}} = \frac{13}{2}$$

$$F = \frac{4}{\frac{2}{3} - \frac{5}{6}} = \frac{4}{\frac{2 \times 2}{3 \times 2} - \frac{5}{6}} = \frac{4}{\frac{4}{6} - \frac{5}{6}} = \frac{4}{\frac{-1}{6}} = 4 \times \frac{6}{-1} = -24$$

$$G = \frac{5}{7} + \left(\frac{3}{2} \right)^2 = \frac{5}{7} + \frac{3^2}{2^2} = \frac{5}{7} + \frac{9}{4} = \frac{5 \times 4}{7 \times 4} + \frac{9 \times 7}{4 \times 7} = \frac{20}{28} + \frac{63}{28} = \frac{83}{28}$$

$$H = \frac{\frac{1}{3} + \frac{1}{4}}{\frac{1}{3 \times 4} - \frac{1}{4 \times 3}} = \frac{\frac{1 \times 5}{3 \times 4} + \frac{1 \times 2}{4 \times 3}}{\frac{5}{12} - \frac{2}{12}} = \frac{\frac{5}{12} + \frac{2}{12}}{\frac{3}{12}} = \frac{\frac{7}{12}}{\frac{1}{4}} = \frac{7}{12} \times \frac{12}{1} = \frac{7 \times 12}{10 \times 1} = \frac{7 \times \boxed{2} \times 6}{\boxed{2} \times 5} = \frac{42}{5}$$

$$I = \frac{\frac{7}{-6} \times \frac{3}{-10}}{\frac{-14}{5} \times \frac{1}{-5}} + \frac{\frac{7 \times 3}{6 \times 10}}{\frac{14 \times 1}{5 \times 5}} = \frac{\frac{7 \times \boxed{3}}{2 \times \boxed{3} \times 10}}{\frac{14}{25}} = \frac{7}{20} = \frac{7}{20} \times \frac{25}{14} = \frac{7 \times 25}{20 \times 14} = \frac{\boxed{7} \times \boxed{5} \times 5}{\boxed{5} \times 4 \times \boxed{7} \times 2} = \frac{5}{8}$$