Préparer son entrée en seconde : calcul numérique 1 (relatifs et fractions)

Correction 1

a. $49\times6=(50-1)\times6=50\times6-1\times6=300-6=294$

b. $21\times13=(20+1)\times13=20\times13+1\times13$
$=260+13=273$

c. $5\times3{,}32+5\times1{,}68=5\times(3{,}32+1{,}68)=5\times5=25$

d. $1{,}2\times3{,}3-0{,}2\times3{,}3=(1{,}2-0{,}2)\times3{,}3=1\times3{,}3=3{,}3$

Correction 2

a. $3+5-2-8=8+(-10)=-2$

b. $4\times3-3\times3=(4-3)\times3=1\times3=3$

c. $2-3\times4+2=2-12+2=4+(-12)=-8$

d. $(3+5)\times2-2=8\times2-2=16-2=14$

e. $10-(6{,}5-4)\times3=10-(2{,}5)\times3=10-7{,}5=2{,}5$

f. Ce produit comporte trois termes négatifs ; le résultat est donc négatif :
$-1\times2\times(-2)\times(-3)=-(1\times2\times2\times3)=-12$

g. $(+3)+(-2)-(-5)+(-1)-(+4)$
$=(+3)+(-2)+(+5)+(-1)+(-4)$
$=(+8)+(-7)=1$

h. Ce produit comporte 4 facteurs négatifs ; le résultat est donc positif :
$1\times1\times(-1)\times(-1)\times1\times(-1)\times1\times1\times(-1)$
$=+(1\times1\times1\times1\times1\times1\times1\times1\times1)=1$

Correction 3

Une video est accessible

a. $\frac{3}{7}+\frac{4}{21}=\frac{9}{21}+\frac{4}{21}=\frac{13}{21}$

b. $-\frac{1}{3}+1=-\frac{1}{3}+\frac{3}{3}=\frac{(-1)+3}{3}=\frac{2}{3}$

c. $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}=\frac{4}{8}+\frac{2}{8}+\frac{1}{8}=\frac{4+2+1}{8}=\frac{7}{8}$

d. $\frac{5}{12}-\frac{2}{3}=\frac{5}{12}-\frac{8}{12}=\frac{5-8}{12}=\frac{-3}{12}=\frac{-1\times3}{4\times3}=\frac{-1}{4}=-\frac{1}{4}$

e. $\frac{1}{2}\times\frac{8}{6}\times\frac{3}{2}=\frac{1}{1}\times\frac{4}{2}\times\frac{1}{2}=\frac{4}{4}=1$

f. Deux des facteurs de ces produits sont négatifs ; le résultat est positif :
$\frac{-5}{2}\times\left(-\frac{2}{3}\right)\times\frac{3}{5}=\frac{5}{2}\times\frac{2}{3}\times\frac{3}{5}=\frac{1}{1}\times\frac{1}{1}\times\frac{1}{1}=1$

g. Ce quotient a quatre facteurs négatifs ; on en déduit que ce quotient a une valeur positive :
$\frac{(-2)\times5\times(-4)\times3\times7\times(-5)}{(-10)\times6}=\frac{2\times5\times4\times3\times7\times5}{10\times6}$
$=\frac{10\times2\times6\times7\times5}{10\times6}=2\times7\times5=70$

Correction 4

Une video est accessible

a. $\frac{3}{4}+\frac{2}{6}=\frac{9}{12}+\frac{4}{12}=\frac{9+4}{12}=\frac{13}{12}$

b. $\frac{2}{15}+\frac{3}{20}=\frac{8}{60}+\frac{9}{60}=\frac{8+9}{60}=\frac{17}{60}$

c. $\frac{5}{12}-\frac{9}{8}=\frac{10}{24}-\frac{27}{24}=\frac{10-27}{24}=\frac{-17}{24}=-\frac{17}{24}$

d. $\frac{5}{6}-\frac{13}{9}=\frac{15}{18}-\frac{26}{18}=\frac{15-26}{18}=\frac{-11}{18}=-\frac{11}{18}$

e. $\frac{5}{12}-\frac{2}{15}=\frac{25}{60}-\frac{8}{60}=\frac{25-8}{60}=\frac{17}{60}$

f. $\frac{15}{66}-\frac{10}{44}=\frac{5}{22}-\frac{5}{22}=0$

Correction 5

Une video est accessible

$A=\frac{2}{3}+\frac{\overset{1}{\cancel{5}}}{3}\times\frac{1}{\underset{3}{\cancel{15}}}=\frac{2}{3}+\frac{1}{3}\times\frac{1}{3}=\frac{2}{3}+\frac{1}{9}=\frac{6}{9}+\frac{1}{9}=\frac{7}{9}$

$B=\left(1-\frac{3}{7}\right)\div\frac{12}{5}=\left(\frac{7}{7}-\frac{3}{7}\right)\times\frac{5}{12}=\frac{\overset{1}{\cancel{4}}}{7}\times\frac{5}{\underset{3}{\cancel{12}}}=\frac{5}{21}$

$C=\frac{\frac{9}{2}}{3}=\frac{\frac{9}{2}}{\frac{3}{1}}=\frac{9}{2}\times\frac{1}{3}=\frac{3}{2}\times\frac{1}{1}=\frac{3}{2}$

$D=\frac{\frac{3}{4}+3}{\frac{1}{2}+2}=\frac{\frac{3+12}{4}}{\frac{1+4}{2}}=\frac{\frac{15}{4}}{\frac{5}{2}}=\frac{15}{4}\times\frac{2}{5}=\frac{30}{20}=\frac{3}{2}$

Correction 6

Une video est accessible

a. $\frac{2}{5}+1=\frac{2}{5}+\frac{5}{5}=\frac{7}{5}$

b. $\frac{3}{4}\times\frac{2}{5}=\frac{3\times2}{4\times5}=\frac{3}{10}$

c. $\frac{1}{3}\times\frac{2}{5}+\frac{2}{5}=\frac{2}{15}+\frac{6}{15}=\frac{8}{15}$

d. $\frac{\frac{3}{5}}{\frac{2}{5}}=\frac{3}{5}\times\frac{5}{2}=\frac{3}{2}$

e. $\frac{\frac{3}{2}-\frac{10}{6}}{\frac{2}{7}+\frac{1}{3}}=\frac{\frac{9}{6}-\frac{10}{6}}{\frac{6}{21}+\frac{7}{21}}=\frac{-\frac{1}{6}}{\frac{13}{21}}=-\frac{1}{6}\times\frac{21}{13}=-\frac{7}{26}$

f. $3-\frac{5}{1+\frac{1}{3}}=3-\frac{5}{\frac{3}{3}+\frac{1}{3}}=3-\frac{5}{\frac{4}{3}}=3-5\times\frac{3}{4}$
$=3-\times\frac{15}{4}=\frac{12}{4}-\frac{15}{4}=-\frac{3}{4}$

Correction 7

a. $\frac{1}{3}-\frac{8}{9}+\frac{5}{6}=\frac{6}{18}-\frac{16}{18}+\frac{15}{18}=\frac{6-16+15}{18}=\frac{5}{18}$

b. $-\frac{2}{3}+\frac{1}{4}-\frac{5}{6}=-\frac{8}{12}+\frac{3}{12}-\frac{10}{12}=\frac{-8+3-10}{12}$

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

c. $\frac{2}{5}-\frac{1}{15}+\frac{2}{3}=\frac{6}{15}-\frac{1}{15}+\frac{10}{15}=\frac{6-1+10}{15}=\frac{15}{15}=1$

d. $\frac{15}{49}\times\frac{21}{25}=\frac{\cancel{15}^{3}}{\cancel{49}_{7}}\times\frac{\cancel{21}^{3}}{\cancel{25}_{5}}=\frac{3}{7}\times\frac{3}{5}=\frac{9}{35}$

e. $\frac{36}{64}\times\frac{24}{30}=\frac{\cancel{36}^{6}}{\cancel{64}_{8}}\times\frac{\cancel{24}^{3}}{\cancel{30}_{5}}=\frac{6}{8}\times\frac{3}{5}=\frac{\cancel{6}^{3}}{\cancel{8}_{4}}\times\frac{3}{5}=\frac{3}{4}\times\frac{3}{5}=\frac{9}{20}$

f. $\frac{55}{32}\times\frac{24}{33}=\frac{\cancel{55}^{5}}{\cancel{32}_{4}}\times\frac{\cancel{24}^{3}}{\cancel{33}_{3}}=\frac{5}{4}\times\frac{3}{3}=\frac{5}{4}\times1=\frac{5}{4}$

g. $\frac{\frac{3}{4}}{\frac{9}{16}}=\frac{3}{4}\times\frac{16}{9}=\frac{\cancel{3}^{1}}{\cancel{4}_{1}}\times\frac{\cancel{16}^{4}}{\cancel{9}_{3}}=\frac{1}{1}\times\frac{4}{3}=1\times\frac{4}{3}=\frac{4}{3}$

h. $\frac{\frac{5}{4}}{25}=\frac{5}{4}\times\frac{1}{25}=\frac{\cancel{5}^{1}}{4}\times\frac{1}{\cancel{25}_{5}}=\frac{1}{4}\times\frac{1}{5}=\frac{1}{20}$

i. $\frac{\frac{21}{14}}{15}=21\times\frac{15}{14}=\cancel{21}^{3}\times\frac{15}{\cancel{14}_{2}}=3\times\frac{15}{2}=\frac{45}{2}$

Correction 8

a. $\frac{2}{3}+\frac{5}{6}=\frac{4}{6}+\frac{5}{6}=\frac{4+5}{6}=\frac{9}{6}=\frac{3}{2}$

b. $\frac{7}{2}-\frac{2}{3}=\frac{21}{6}-\frac{4}{6}=\frac{21-4}{6}=\frac{17}{6}$

c. $\frac{7}{3}\times\frac{5}{4}+\frac{1}{6}=\frac{7\times5}{3\times4}+\frac{1}{6}=\frac{35}{12}+\frac{1}{6}=\frac{35}{12}+\frac{2}{12}=\frac{35+2}{12}=\frac{37}{12}$

d. $\frac{15}{9}\times\frac{12}{25}-\frac{7}{4}=\frac{\cancel{15}^{3}}{\cancel{9}_{3}}\times\frac{\cancel{12}^{4}}{\cancel{25}_{5}}-\frac{7}{4}=\frac{3}{3}\times\frac{4}{5}-\frac{7}{4}=\frac{4}{5}-\frac{7}{4}$

$=\frac{16}{20}-\frac{35}{20}=\frac{16-35}{20}=\frac{-19}{20}=-\frac{19}{20}$

e. $\frac{9}{28}\times\frac{7}{5}+\frac{10}{3}\times\frac{6}{25}=\frac{9}{\cancel{28}_{4}}\times\frac{\cancel{7}^{1}}{5}+\frac{\cancel{10}^{2}}{\cancel{3}_{1}}\times\frac{\cancel{6}^{2}}{\cancel{25}_{5}}$

$=\frac{9}{4}\times\frac{1}{5}+\frac{2}{1}\times\frac{2}{5}=\frac{9}{20}+\frac{4}{5}=\frac{9}{20}+\frac{16}{20}=\frac{25}{20}=\frac{5}{4}$

f. $\left(\frac{7}{3}-5\right)\times\frac{2}{5}=\left(\frac{7}{3}-\frac{15}{3}\right)\times\frac{2}{5}=\frac{7-15}{3}\times\frac{2}{5}=\frac{-8}{3}\times\frac{2}{5}$

$=-\frac{8\times2}{3\times5}=-\frac{16}{15}$

Correction 9

a. $\frac{-2}{-9}\times\frac{-3}{8}+\frac{3}{-36}=-\frac{\cancel{2}^{1}}{\cancel{9}_{3}}\times\frac{\cancel{3}^{1}}{\cancel{8}_{4}}-\frac{\cancel{3}^{1}}{\cancel{36}_{12}}=-\frac{1}{3}\times\frac{1}{4}-\frac{1}{12}$

$=\frac{-1}{12}+\frac{-1}{12}=\frac{-2}{12}=\frac{-1}{6}$

b. $\left(\frac{3}{-3}+\frac{5}{6}\right)\left(2+\frac{-9}{2}\right)=\left(\frac{-6}{6}+\frac{5}{6}\right)\left(\frac{4}{2}+\frac{-9}{2}\right)$

$=\frac{-1}{6}\times\frac{-5}{2}=\frac{5}{12}$

c. $\left(\frac{1}{3}-1\right)^2\left[\frac{1}{3}+\left(\frac{1}{2}\right)^2\right]=\left(\frac{1}{3}-\frac{3}{3}\right)^2\left(\frac{1}{3}+\frac{1}{4}\right)$

$=\left(-\frac{2}{3}\right)^2\left(\frac{4}{12}+\frac{3}{12}\right)=\frac{4}{9}\times\frac{7}{12}=\frac{\cancel{4}^{1}}{9}\times\frac{7}{\cancel{12}_{3}}=\frac{7}{27}$

d. $\frac{\left(3-\frac{9}{5}\right)^2}{1-\frac{1}{5}}=\frac{\left(\frac{15}{5}-\frac{9}{5}\right)^2}{\frac{5}{5}-\frac{1}{5}}=\frac{\left(\frac{6}{5}\right)^2}{\frac{4}{5}}=\frac{\frac{36}{25}}{\frac{4}{5}}=\frac{36}{25}\times\frac{5}{4}=\frac{9}{5}$

Correction 10

a. $\frac{2}{7}-\frac{15}{7}\div\frac{5}{4}=\frac{2}{7}-\frac{15}{7}\times\frac{4}{5}=\frac{2}{7}-\frac{\cancel{15}^{3}}{7}\times\frac{4}{\cancel{5}_{1}}$

$=\frac{2}{7}-\frac{3}{7}\times4=\frac{2}{7}-\frac{12}{7}=\frac{2-12}{7}=\frac{-10}{7}$

b. $\left(\frac{1}{4}-\frac{1}{5}\right)\times\left(7+\frac{37}{9}\right)=\left(\frac{5}{20}-\frac{4}{20}\right)\times\left(\frac{63}{9}+\frac{37}{9}\right)$

$=\frac{1}{20}\times\frac{100}{9}=\frac{1}{\cancel{20}_{1}}\times\frac{\cancel{100}^{5}}{9}=\frac{5}{9}$

c. $\frac{\frac{4}{3}+\frac{3}{10}}{\frac{5}{2}-\frac{2}{5}}=\frac{\frac{40}{30}+\frac{9}{30}}{\frac{25}{10}-\frac{4}{10}}=\frac{\frac{49}{30}}{\frac{21}{10}}=\frac{49}{30}\times\frac{10}{21}$

$=\frac{\cancel{49}^{7}}{\cancel{30}_{3}}\times\frac{\cancel{10}^{1}}{\cancel{21}_{3}}=\frac{7}{3}\times\frac{1}{3}=\frac{7}{9}$

Correction 11

1. $\frac{\left(1+\frac{1}{2}\right)^2}{\frac{3}{5}+\frac{3}{4}}=\frac{\left(\frac{2}{2}+\frac{1}{2}\right)^2}{\frac{12}{20}+\frac{15}{20}}=\frac{\left(\frac{3}{2}\right)^2}{\frac{27}{20}}=\frac{\frac{9}{4}}{\frac{27}{20}}=\frac{9}{4}\times\frac{20}{27}$

$=\frac{1}{1}\times\frac{5}{3}=\frac{5}{3}$

2. $\frac{2}{1+\frac{3}{2+\frac{5}{2}}}=\frac{2}{1+\frac{3}{\frac{4}{2}+\frac{5}{2}}}=\frac{2}{1+\frac{3}{\frac{9}{2}}}=\frac{2}{1+3\times\frac{2}{9}}=\frac{2}{1+\frac{2}{3}}$

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

3. $\frac{\frac{7}{8}-\frac{7}{8}\times\frac{3}{7}}{3\times2-2}=\frac{\frac{7}{8}-\frac{1}{8}\times\frac{3}{1}}{6-2}=\frac{\frac{7}{8}-\frac{3}{8}}{4}=\frac{\frac{4}{8}}{4}=\frac{\frac{1}{2}}{4}=\frac{1}{2}\times\frac{1}{4}=\frac{1}{8}$

4. $\left(\frac{\frac{25}{2}}{\left(\frac{5}{4}\right)^2}\right)^2=\left(\frac{\frac{25}{2}}{\frac{25}{16}}\right)^2=\left(\frac{25}{2}\times\frac{16}{25}\right)^2=\left(\frac{16}{2}\right)^2$

$=8^2=64$

Correction 12

Une video est accessible

$$A = \frac{2}{3} + \frac{\cancel{5}^{1}}{3} \times \frac{1}{\cancel{15}_{3}} = \frac{2}{3} + \frac{1}{3} \times \frac{1}{3} = \frac{2}{3} + \frac{1}{9} = \frac{6}{9} + \frac{1}{9} = \frac{7}{9}$$

$$B = \left(1 - \frac{3}{7}\right) \div \frac{12}{5} = \left(\frac{7}{7} - \frac{3}{7}\right) \times \frac{5}{12} = \frac{\cancel{4}^{1}}{7} \times \frac{5}{\cancel{12}_{3}} = \frac{5}{21}$$

$$C = \frac{\frac{9}{2}}{3} = \frac{\frac{9}{2}}{\frac{3}{1}} = \frac{9}{2} \times \frac{1}{3} = \frac{3}{2} \times \frac{1}{1} = \frac{3}{2}$$

$$D = \frac{\frac{3}{4} + 3}{\frac{1}{2} + 2} = \frac{\frac{3+12}{4}}{\frac{1+4}{2}} = \frac{\frac{15}{4}}{\frac{5}{2}} = \frac{15}{4} \times \frac{2}{5} = \frac{30}{20} = \frac{3}{2}$$

Correction 13

Une video est accessible

a. $\frac{2}{5} + 1 = \frac{2}{5} + \frac{5}{5} = \frac{7}{5}$

b. $\frac{3}{4} \times \frac{2}{5} = \frac{3 \times 2}{4 \times 5} = \frac{3}{10}$

c. $\frac{1}{3} \times \frac{2}{5} + \frac{2}{5} = \frac{2}{15} + \frac{6}{15} = \frac{8}{15}$

d. $\frac{\frac{3}{5}}{\frac{2}{5}} = \frac{3}{5} \times \frac{5}{2} = \frac{3}{2}$

e. $\frac{\frac{3}{2} - \frac{10}{6}}{\frac{2}{7} + \frac{1}{3}} = \frac{\frac{9}{6} - \frac{10}{6}}{\frac{6}{21} + \frac{7}{21}} = \frac{-\frac{1}{6}}{\frac{13}{21}} = -\frac{1}{6} \times \frac{21}{13} = -\frac{7}{26}$

f. $3 - \frac{5}{1 + \frac{1}{3}} = 3 - \frac{5}{\frac{3}{3} + \frac{1}{3}} = 3 - \frac{5}{\frac{4}{3}} = 3 - 5 \times \frac{3}{4}$

$= 3 - \times \frac{15}{4} = \frac{12}{4} - \frac{15}{4} = -\frac{3}{4}$

Correction 14

Une video est accessible

a. $5 - \frac{2}{3} - \frac{5}{6} = \frac{30}{6} - \frac{4}{6} - \frac{5}{6} = \frac{30 - 4 - 5}{6} = \frac{21}{6} = \frac{7}{2}$

b. $\frac{5}{2} - \frac{15}{6} \times \frac{21}{25} = \frac{5}{2} - \frac{3}{2} \times \frac{7}{5} = \frac{5}{2} - \frac{3 \times 7}{2 \times 5} = \frac{5}{2} - \frac{21}{10}$

$= \frac{25}{10} - \frac{21}{10} = \frac{4}{10} = \frac{2}{5}$

c. $\left(\frac{2}{3} + \frac{5}{6}\right)\left(\frac{1}{3} - \frac{5}{2}\right) = \left(\frac{4}{6} + \frac{5}{6}\right)\left(\frac{2}{6} - \frac{15}{6}\right) = \frac{9}{6} \times \left(-\frac{13}{6}\right)$

$= -\frac{3}{2} \times \frac{13}{6} = -\frac{1}{2} \times \frac{13}{2} = -\frac{13}{4}$

d. $\frac{6}{5} \times \left(\frac{16}{9} \times \frac{6}{32} - \frac{15}{12}\right) = \frac{6}{5} \times \left(\frac{1}{3} \times \frac{2}{2} - \frac{15}{12}\right) = \frac{6}{5} \times \left(\frac{1}{3} - \frac{15}{12}\right)$

$= \frac{6}{5} \times \left(\frac{4}{12} - \frac{15}{12}\right) = \frac{6}{5} \times \left(-\frac{11}{12}\right) = -\frac{6}{5} \times \frac{11}{12}$

$= -\frac{1}{5} \times \frac{11}{2} = -\frac{11}{10}$

e. $\frac{2 - \frac{5}{12}}{\frac{1}{3} - \frac{8}{5}} = \frac{\frac{24}{12} - \frac{5}{12}}{\frac{5}{15} - \frac{24}{15}} = \frac{\frac{24 - 5}{12}}{\frac{5 - 24}{15}} = \frac{\frac{19}{12}}{\frac{-19}{15}}$

$= \frac{19}{12} \times \left(-\frac{15}{19}\right) = -\frac{19}{12} \times \frac{15}{19} = -\frac{1}{12} \times \frac{15}{1} = -\frac{15}{12} = -\frac{5}{4}$

f. $\left(\frac{5}{2} - \frac{6}{25} \times \frac{15}{12}\right) \times \frac{6}{22} - \frac{3}{15} = \left(\frac{5}{2} - \frac{1}{5} \times \frac{3}{2}\right) \times \frac{6}{22} - \frac{3}{15}$

$= \left(\frac{5}{2} - \frac{3}{10}\right) \times \frac{6}{22} - \frac{3}{15} = \left(\frac{25}{10} - \frac{3}{10}\right) \times \frac{6}{22} - \frac{3}{15}$

$= \frac{22}{10} \times \frac{6}{22} - \frac{3}{15} = \frac{6}{10} - \frac{3}{15} = \frac{3}{5} - \frac{1}{5} = \frac{2}{5}$

Correction 15

Une video est accessible

a. $5 - \frac{2}{3} - \frac{5}{6} = \frac{30}{6} - \frac{4}{6} - \frac{5}{6} = \frac{30 - 4 - 5}{6} = \frac{21}{6} = \frac{7}{2}$

b. $\frac{5}{2} - \frac{15}{6} \times \frac{21}{25} = \frac{5}{2} - \frac{3}{2} \times \frac{7}{5} = \frac{5}{2} - \frac{3 \times 7}{2 \times 5} = \frac{5}{2} - \frac{21}{10}$

$= \frac{25}{10} - \frac{21}{10} = \frac{4}{10} = \frac{2}{5}$

c. $\left(\frac{2}{3} + \frac{5}{6}\right)\left(\frac{1}{3} - \frac{5}{2}\right) = \left(\frac{4}{6} + \frac{5}{6}\right)\left(\frac{2}{6} - \frac{15}{6}\right) = \frac{9}{6} \times \left(-\frac{13}{6}\right)$

$= -\frac{3}{2} \times \frac{13}{6} = -\frac{1}{2} \times \frac{13}{2} = -\frac{13}{4}$

d. $\frac{6}{5} \times \left(\frac{16}{9} \times \frac{6}{32} - \frac{15}{12}\right) = \frac{6}{5} \times \left(\frac{1}{3} \times \frac{2}{2} - \frac{15}{12}\right) = \frac{6}{5} \times \left(\frac{1}{3} - \frac{15}{12}\right)$

$= \frac{6}{5} \times \left(\frac{4}{12} - \frac{15}{12}\right) = \frac{6}{5} \times \left(-\frac{11}{12}\right) = -\frac{6}{5} \times \frac{11}{12}$

$= -\frac{1}{5} \times \frac{11}{2} = -\frac{11}{10}$

e. $\frac{2 - \frac{5}{12}}{\frac{1}{3} - \frac{8}{5}} = \frac{\frac{24}{12} - \frac{5}{12}}{\frac{5}{15} - \frac{24}{15}} = \frac{\frac{24 - 5}{12}}{\frac{5 - 24}{15}} = \frac{\frac{19}{12}}{\frac{-19}{15}}$

$= \frac{19}{12} \times \left(-\frac{15}{19}\right) = -\frac{19}{12} \times \frac{15}{19} = -\frac{1}{12} \times \frac{15}{1} = -\frac{15}{12} = -\frac{5}{4}$

f. $\left(\frac{5}{2} - \frac{6}{25} \times \frac{15}{12}\right) \times \frac{6}{22} - \frac{3}{15} = \left(\frac{5}{2} - \frac{1}{5} \times \frac{3}{2}\right) \times \frac{6}{22} - \frac{3}{15}$

$= \left(\frac{5}{2} - \frac{3}{10}\right) \times \frac{6}{22} - \frac{3}{15} = \left(\frac{25}{10} - \frac{3}{10}\right) \times \frac{6}{22} - \frac{3}{15}$

$= \frac{22}{10} \times \frac{6}{22} - \frac{3}{15} = \frac{6}{10} - \frac{3}{15} = \frac{3}{5} - \frac{1}{5} = \frac{2}{5}$