1. Realiza las siguientes operaciones. ***Recuerda simplificar antes de reducir a común denominador; y en las multiplicaciones y divisiones descomponer para también simplificar***:

$a)\ \frac{4}{8}+\frac{16}{32}-\frac{6}{12}-\frac{14}{28}=0$

$b)\ \frac{2}{12}+\frac{3}{9}-\frac{7}{21}+\frac{8}{24}=\frac{1}{2}$

$c)\ \frac{1}{4}\cdot\frac{2}{3}+\frac{1}{2}:\frac{3}{5}-\frac{3}{4}\cdot\frac{2}{6}=\frac{3}{4}$

$d)\ \left(\frac{1}{2}\right)^2-\left(-\frac{1}{2}\right)^2+\frac{3}{9}:\frac{2}{6}-2=-1$

$e)\ \left(1-\frac{3}{2}\right)^2+\frac{7}{2}:\frac{28}{2}-\frac{3}{2}+1=0$

$f)\ \frac{35}{12}\cdot\frac{6}{14}\cdot\frac{1}{5}+2\cdot3\cdot\frac{1}{12}=\frac{3}{4}$

$g)\ \frac{1}{9}:\left(1-\frac{4}{3}\right)^2+\frac{1}{3}-\frac{1}{3}\cdot(2-3)=\frac{5}{3}$

$h)\ \frac{2}{4}\cdot\frac{5}{7}\cdot\frac{21}{15}-\frac{1}{3}\cdot\frac{7}{4}\cdot\frac{1}{14}=\frac{11}{24}$

$i)\ \left[\left(\frac{2}{3}\right)^2-\frac{5}{9}\right]\cdot\frac{6}{2}+\frac{4}{5}\cdot\frac{15}{9}-2=-1$

$j)\ \frac{9}{27}+\frac{4}{36}-\frac{5}{15}+\frac{7}{63}=\frac{2}{9}$

$k)\ \frac{3}{21}+\frac{14}{49}-\frac{3}{7}-\frac{4}{28}=-\frac{1}{7}$

$l)\ \frac{3}{5}\cdot\frac{15}{6}-\frac{9}{14}:\frac{3}{7}+\left(\frac{1}{2}\right)^2\cdot2=\frac{1}{2}$

$m)\ \left(\frac{1}{3}\right)^2-\left(-\frac{1}{3}\right)^2+\frac{5}{30}:\frac{4}{12}-1=-\frac{1}{2}$

$n)\ \left(2-\frac{1}{2}\right)^2+\frac{3}{18}:\frac{4}{6}-\left(\frac{1}{4}-1\right)=\frac{13}{4}$

$o)\ \left(-\frac{3}{2}\cdot\frac{4}{7}\cdot\frac{5}{6}+\frac{2}{14}\right)\cdot\frac{7}{2}+\left(-\frac{3}{2}\right)^2-1=-\frac{3}{4}$

$p)\ \left(-\frac{1}{5}\right)^2-\frac{12}{25}-\frac{6}{15}+\frac{4}{5}:\frac{15}{6}=-\frac{13}{25}$

$q)\ \left(\frac{2}{5}-1\right)^2+\frac{28}{75}\cdot\frac{6}{14}+\left(\frac{7}{5}-2\right)^2\cdot\frac{1}{3}=\frac{16}{25}$

$r)\ \frac{7}{28}+\frac{8}{64}-\frac{64}{128}+\frac{21}{42}=\frac{3}{8}$

$s)\ \frac{14}{49}+\frac{8}{28}-\frac{24}{42}+\frac{16}{56}=\frac{2}{7}$

$t)\ \frac{12}{21}\cdot\frac{14}{6}-\left(-\frac{1}{3}\right)^2+\frac{15}{27}:\frac{25}{15}=\frac{14}{9}$

$u)\ \left(1-\frac{3}{2}\right)^2-2-\frac{1}{4}+\frac{13}{14}\cdot\frac{28}{26}=-1$

$v)\ \left(\frac{5}{7}-\frac{3}{14}\right)\cdot\frac{3}{2}+\left(-\frac{1}{2}\right)^2+\frac{3}{8}\cdot2=\frac{7}{4}$

$w)\ \left(-\frac{4}{6}\right)^2+\left[\left(4-\frac{3}{2}\right)\cdot\frac{3}{5}\right]^2-\frac{27}{25}\cdot\frac{75}{81}=\frac{61}{36}$

$x)\ \left(-\frac{14}{2}\cdot\frac{3}{7}:\frac{12}{2}\right)\cdot\frac{3}{2}+\frac{7}{4}-\left(-\frac{1}{2}\right)^3=\frac{9}{8}$

$y)\ 3-\frac{2}{5}-\frac{7}{3}\cdot\frac{15}{3}+\frac{4}{8}:\frac{6}{4}+\left(-\frac{2}{3}\right)^2=-\frac{373}{45}$

2. Realiza los siguientes ejercicios de potencias con fracciones, dejando el resultado como una única potencia.

$A)\left(\frac{1}{2}\right)^3\cdot\left(\frac{1}{2}\right)^5\cdot\left(\frac{1}{2}\right)^8:\left(\frac{1}{2}\right)^{12}=\left(\frac{1}{2}\right)^4$

$B)\left(-\frac{5}{2}\right)^5\cdot\left(-\frac{5}{2}\right)^8:\left(-\frac{5}{2}\right)^6:\left(-\frac{5}{2}\right)^7=1$

$C)\frac{\left(\frac{1}{5}\right)^6\cdot\left(\frac{1}{5}\right)^7}{\left(\frac{1}{5}\right)^3\cdot\left(\frac{1}{5}\right)^4\cdot\left(\frac{1}{5}\right)^5}=\left(\frac{1}{5}\right)^1=\frac{1}{5}$

$D)\frac{\left(\frac{6}{7}\right)^8\cdot\left(\frac{6}{7}\right)^7}{\left(\frac{6}{7}\right)^5\cdot\left(\frac{6}{7}\right)^5\cdot\left(\frac{6}{7}\right)^3}=\left(\frac{6}{7}\right)^2$

$E)\frac{\left(\frac{4}{7}\right)^6\cdot\left(\frac{4}{7}\right)^{12}\cdot\left(\frac{4}{7}\right)^{10}}{\left(\frac{4}{7}\right)^{11}\cdot\left(\frac{4}{7}\right)^9\cdot\left(\frac{4}{7}\right)^5}=\left(\frac{4}{7}\right)^3$

$F)\frac{\left(\frac{3}{2}\right)^8\cdot\left(\frac{3}{2}\right)^9\cdot\left(\frac{3}{2}\right)^4}{\left(\frac{3}{2}\right)^5\cdot\left(\frac{3}{2}\right)^7\cdot\left(\frac{3}{2}\right)^7}=\left(\frac{3}{2}\right)^2$

$G)\frac{\left(-\frac{3}{4}\right)^5\cdot\left(-\frac{3}{4}\right)^4\cdot\left(-\frac{3}{4}\right)^3}{\left(-\frac{3}{4}\right)^2\cdot\left(-\frac{3}{4}\right)^6}=\left(-\frac{3}{4}\right)^4$

Ejemplo de simplificar las bases: $\left(\frac{3}{5}\right)^5\cdot\left(\frac{6}{10}\right)^6\cdot\left(\frac{9}{15}\right)^3=\left(\frac{3}{5}\right)^5\cdot\left(\frac{3}{5}\right)^6\cdot\left(\frac{3}{5}\right)^3=\left(\frac{3}{5}\right)^{14}$

$a.\left(-\frac{4}{8}\right)^5\cdot\left(-\frac{1}{2}\right)^3\cdot\left(-\frac{9}{18}\right)^2=\left(-\frac{1}{2}\right)^{10}$

$b.\left(\frac{7}{21}\right)^5\cdot\left(\frac{1}{3}\right)^6:\left(\frac{3}{9}\right)^8=\left(\frac{1}{3}\right)^3$

$c.\left(-\frac{18}{21}\right)^9\cdot\left(-\frac{12}{14}\right)^6:\left(-\frac{6}{7}\right)^{13}=\left(-\frac{6}{7}\right)^2$

$d.\left(\frac{2}{5}\right)^{10}\cdot\left(\frac{2}{5}\right)^{11}\cdot\left(\frac{4}{10}\right)^{13}:\left(\frac{10}{25}\right)^{32}=\left(\frac{2}{5}\right)^2$

$e.\left(\frac{1}{5}\right)^2\cdot\left(\frac{2}{10}\right)^3\cdot\left(\frac{3}{15}\right)^4\cdot\left(\frac{4}{20}\right)^5:\left(\frac{5}{25}\right)^6=\left(\frac{1}{5}\right)^8$

$f.\left(\frac{2}{9}\right)^6\cdot\left(\frac{4}{12}\right)^3\cdot\left(\frac{6}{27}\right)^4:\left[\left(\frac{10}{45}\right)^5\cdot\left(\frac{8}{36}\right)^6\right]=\left(\frac{2}{9}\right)^2$

Ejemplo de descomponer las bases; se hay que fijar en la base más pequeña y las otras son potencias de esa, pero elevadas a un exponente:

$$\frac{\left(\frac{4}{25}\right)^3\cdot\left(\frac{2}{5}\right)^8}{\left(\frac{8}{125}\right)^4}=\frac{\left(\left(\frac{2}{5}\right)^2\right)^3\cdot\left(\frac{2}{5}\right)^8}{\left(\left(\frac{2}{5}\right)^3\right)^4}=\frac{\left(\frac{2}{5}\right)^6\cdot\left(\frac{2}{5}\right)^8}{\left(\frac{2}{5}\right)^{12}}=\frac{\left(\frac{2}{5}\right)^{14}}{\left(\frac{2}{5}\right)^{12}}=\left(\frac{2}{5}\right)^2$$

$A)\frac{\left(\frac{4}{25}\right)^2\cdot\left(\frac{2}{5}\right)^{10}}{\left(\frac{8}{125}\right)^3}=\left(\frac{2}{5}\right)^5$

$B)\left(\frac{2}{3}\right)^6\cdot\left(\frac{2}{3}\right)^2\cdot\left(\frac{4}{9}\right)^3:\left(\frac{8}{27}\right)^4=\left(\frac{2}{3}\right)^2$

$C)\left(\frac{9}{100}\right)^3\cdot\left(\frac{3}{10}\right)^4\cdot\left(\frac{9}{100}\right)^2:\left(\frac{27}{1000}\right)^4=\left(\frac{3}{10}\right)^2$

$D)\frac{\left(\frac{4}{9}\right)^2\cdot\left(\frac{2}{3}\right)^9}{\left(\frac{8}{27}\right)^4}=\left(\frac{2}{3}\right)^1=\frac{2}{3}$

$E)\frac{\left(\frac{5}{6}\right)^7\cdot\left(\frac{25}{36}\right)^9\cdot\left(\frac{5}{6}\right)^2}{\left(\frac{125}{216}\right)^6\cdot\left(\frac{25}{36}\right)^3}=\left(\frac{5}{6}\right)^3$