

## FRACCIONES

### EJERCICIOS RESUELTOS

#### Fracciones

1.- Escribe la fracción correspondiente a cada enunciado:

a) He recorrido 20 *km* de 54 *km*.

$$\frac{20}{54} \text{ km} = \frac{2 \cdot 2 \cdot 5}{2 \cdot 3 \cdot 3 \cdot 3} \text{ km} = \frac{10}{27} \text{ km}$$

b) El bizcocho tarda en hacerse una hora y media.

$$1 \frac{1}{2} \text{ h} = \frac{3}{2} \text{ h}$$

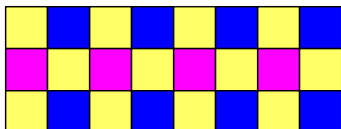
c) En el depósito quedan seis décimas partes de aceite.

$$\frac{6}{10} = \frac{2 \cdot 3}{2 \cdot 5} = \frac{3}{5}$$

d) Existe una probabilidad de 1 entre 100 de que toque el premio.

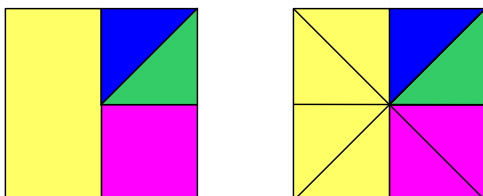
$$\frac{1}{100}$$

2.- Indica la fracción del total que representa cada parte coloreada:



$$\text{Yellow square} \quad \frac{12}{24} = \frac{1}{2} \quad \text{Blue square} \quad \frac{8}{24} = \frac{1}{3} \quad \text{Pink square} \quad \frac{4}{24} = \frac{1}{6}$$

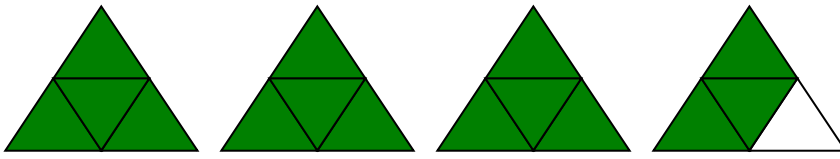
3.- Indica la fracción del total que representa cada parte coloreada:



$$\text{Yellow square} \quad \frac{4}{8} = \frac{1}{2} \quad \text{Blue square} \quad \frac{1}{8} \quad \text{Green square} \quad \frac{1}{8} \quad \text{Pink square} \quad \frac{2}{8} = \frac{1}{4}$$

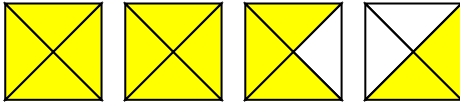
4.- Indica la fracción representada:

a)



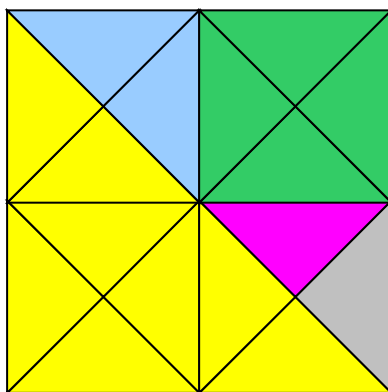
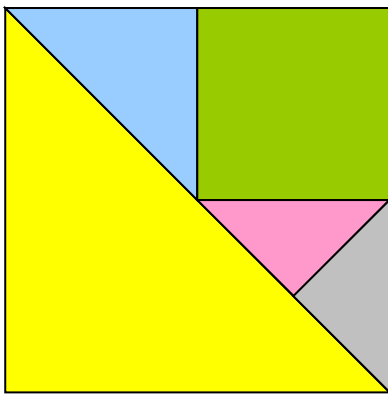
$$\frac{15}{4} = 3\frac{3}{4}$$

b)



$$\frac{13}{4} = 3\frac{1}{4}$$

5.- Indica la fracción del total que representa cada parte coloreada:



$$\text{Yellow square} \quad \frac{8}{16} = \frac{1}{2}$$

$$\text{Blue square} \quad \frac{2}{16} = \frac{1}{8}$$

$$\text{Green square} \quad \frac{4}{16} = \frac{1}{4}$$

$$\text{Pink square} \quad \frac{1}{16}$$

$$\text{Gray square} \quad \frac{1}{16}$$

6.- Expresa como número mixto o como fracción, según corresponda:

a)  $\frac{25}{4}$

$$\frac{25}{4} = 6\frac{1}{4}$$

b)  $\frac{20}{7}$

$$\frac{20}{7} = 2\frac{6}{7}$$

c)  $5\frac{2}{3}$

$$5\frac{2}{3} = \frac{17}{3}$$

d)  $4\frac{2}{9}$

$$4\frac{2}{9} = \frac{38}{9}$$

7.- Calcula:

a)  $\frac{2}{5}$  de 50

$$\frac{2}{5} \text{ de } 50 = \frac{2 \cdot 50}{5} = \frac{100}{5} = \mathbf{20}$$

b)  $\frac{3}{8}$  de 40

$$\frac{3}{8} \text{ de } 40 = \frac{3 \cdot 40}{8} = \frac{120}{8} = \mathbf{15}$$

c)  $\frac{7}{12}$  de 240

$$\frac{7}{12} \text{ de } 240 = \frac{7 \cdot 240}{12} = \frac{1.680}{12} = \mathbf{140}$$

d)  $\frac{9}{14}$  de 42

$$\frac{9}{14} \text{ de } 42 = \frac{9 \cdot 42}{14} = \frac{378}{14} = \mathbf{27}$$

8.- Determina el signo de las siguientes fracciones de términos enteros:

a)  $\frac{+3}{+5}$

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

b)  $\frac{-1}{4}$

$$\frac{-1}{4} = -\frac{1}{4}$$

c)  $\frac{3}{-7}$

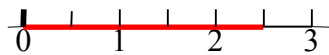
$$\frac{3}{-7} = -\frac{3}{7}$$

d)  $\frac{-5}{-6}$

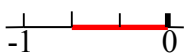
$$\frac{-5}{-6} = \frac{5}{6}$$

9.- Representa las fracciones en la recta numérica:

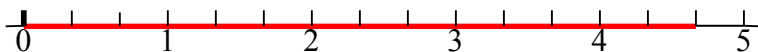
a)  $\frac{5}{2} = 2\frac{1}{2}$



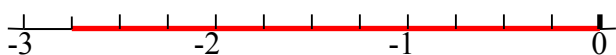
b)  $-\frac{2}{3}$



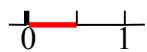
c)  $\frac{14}{3} = 4\frac{2}{3}$



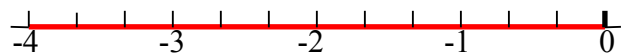
d)  $-\frac{11}{4} = -2\frac{3}{4}$



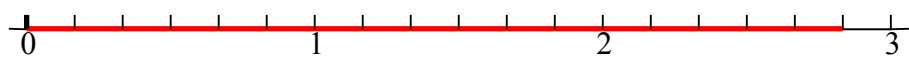
e)  $\frac{1}{2}$



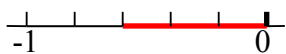
f)  $-\frac{12}{3} = -4$



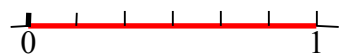
g)  $\frac{17}{6} = 2\frac{5}{6}$



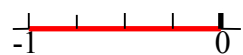
h)  $-\frac{3}{5}$



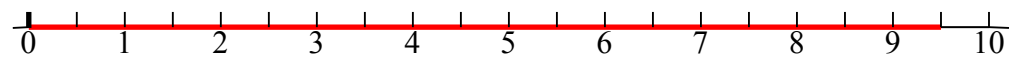
i)  $\frac{6}{6} = 1$



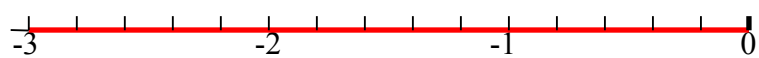
j)  $-\frac{4}{4} = -1$



k)  $\frac{19}{2} = 9\frac{1}{2}$



l)  $-\frac{15}{5} = -3$



10.- Comprueba si son equivalentes los siguientes pares de fracciones:

a)  $\frac{8}{32}$  y  $\frac{3}{12}$

$$\left\{ \begin{array}{l} 8 \cdot 12 = 96 \\ 32 \cdot 3 = 96 \end{array} \right\} \Rightarrow \frac{8}{32} = \frac{3}{12}$$

b)  $\frac{14}{10}$  y  $\frac{21}{15}$

$$\left\{ \begin{array}{l} 14 \cdot 15 = 210 \\ 10 \cdot 21 = 210 \end{array} \right\} \Rightarrow \frac{14}{10} = \frac{21}{15}$$

c)  $\frac{25}{30}$  y  $\frac{5}{10}$

$$\left\{ \begin{array}{l} 25 \cdot 10 = 250 \\ 30 \cdot 5 = 150 \end{array} \right\} \Rightarrow \frac{25}{30} \neq \frac{5}{10}$$

d)  $\frac{8}{12}$  y  $\frac{4}{3}$

$$\left\{ \begin{array}{l} 8 \cdot 3 = 24 \\ 12 \cdot 4 = 48 \end{array} \right\} \Rightarrow \frac{8}{12} \neq \frac{4}{3}$$

e)  $\frac{10}{16}$  y  $\frac{15}{24}$

$$\left\{ \begin{array}{l} 10 \cdot 24 = 240 \\ 16 \cdot 15 = 240 \end{array} \right\} \Rightarrow \frac{10}{16} = \frac{15}{24}$$

f)  $\frac{16}{25}$  y  $\frac{20}{30}$

$$\left\{ \begin{array}{l} 16 \cdot 30 = 480 \\ 25 \cdot 20 = 500 \end{array} \right\} \Rightarrow \frac{16}{25} \neq \frac{20}{30}$$

11.- Calcula el término desconocido  $x$  para que se cumpla la equivalencia entre fracciones:

a)  $\frac{5}{10} = \frac{2}{x}$

$$\frac{5}{10} = \frac{2}{x} \Rightarrow 5 \cdot x = 10 \cdot 2 \Rightarrow 5 \cdot x = 20 \Rightarrow x = 4$$

b)  $\frac{2}{15} = \frac{x}{30}$

$$\frac{2}{15} = \frac{x}{30} \Rightarrow x = \frac{2 \cdot 30}{15} = \frac{60}{15} = 4$$

$$c) \frac{5}{x} = \frac{15}{51}$$

$$\frac{5}{x} = \frac{15}{51} \Rightarrow x = \frac{5 \cdot 51}{15} = \frac{255}{15} = 17$$

$$d) \frac{x}{10} = \frac{12}{40}$$

$$\frac{x}{10} = \frac{12}{40} \Rightarrow x = \frac{10 \cdot 12}{40} = \frac{120}{40} = 3$$

$$e) \frac{x}{3} = \frac{27}{x}$$

$$\frac{x}{3} = \frac{27}{x} \Rightarrow x \cdot x = 3 \cdot 27 \Rightarrow x^2 = 81 \Rightarrow x = 9$$

$$f) \frac{16}{x} = \frac{x}{4}$$

$$\frac{16}{x} = \frac{x}{4} \Rightarrow x \cdot x = 16 \cdot 4 \Rightarrow x^2 = 64 \Rightarrow x = 8$$

12.- Simplifica a la fracción irreducible:

$$a) \frac{54}{24} = \frac{2 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3} = \frac{9}{4}$$

|    |   |    |   |
|----|---|----|---|
| 54 | 2 | 24 | 2 |
| 27 | 3 | 12 | 2 |
| 9  | 3 | 6  | 2 |
| 3  | 3 | 3  | 3 |
| 1  |   | 1  |   |

$$b) \frac{40}{88}$$

$$\frac{40}{88} = \frac{2 \cdot 2 \cdot 2 \cdot 5}{2 \cdot 2 \cdot 2 \cdot 11} = \frac{5}{11}$$

|    |   |    |    |
|----|---|----|----|
| 40 | 2 | 88 | 2  |
| 20 | 2 | 44 | 2  |
| 10 | 2 | 22 | 2  |
| 5  | 5 | 11 | 11 |
| 1  |   | 1  |    |

c)  $\frac{81}{36}$

$$\frac{81}{36} = \frac{3 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{9}{4}$$

|    |   |    |   |
|----|---|----|---|
| 81 | 3 | 36 | 2 |
| 27 | 3 | 18 | 2 |
| 9  | 3 | 9  | 3 |
| 3  | 3 | 3  | 3 |
| 1  |   | 1  |   |

d)  $\frac{72}{32}$

$$\frac{72}{32} = \frac{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{9}{4}$$

|    |   |    |   |
|----|---|----|---|
| 72 | 2 | 32 | 2 |
| 36 | 2 | 16 | 2 |
| 18 | 2 | 8  | 2 |
| 9  | 3 | 4  | 2 |
| 3  | 3 | 2  | 2 |
| 1  |   | 1  |   |

e)  $\frac{75}{185}$

$$\frac{75}{185} = \frac{3 \cdot 5 \cdot 5}{5 \cdot 37} = \frac{15}{37}$$

f)  $\frac{50}{110}$

$$\frac{50}{110} = \frac{2 \cdot 5 \cdot 5}{2 \cdot 5 \cdot 11} = \frac{5}{11}$$

|    |   |     |    |
|----|---|-----|----|
| 50 | 2 | 110 | 2  |
| 25 | 5 | 55  | 5  |
| 5  | 5 | 11  | 11 |
| 1  |   | 1   |    |

$$g) \frac{420}{560} \quad \frac{420}{560} = \frac{2 \cdot 2 \cdot 3 \cdot 5 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot 7} = \frac{3}{4}$$

|     |   |     |   |
|-----|---|-----|---|
| 420 | 2 | 560 | 2 |
| 210 | 2 | 280 | 2 |
| 105 | 3 | 140 | 2 |
| 35  | 5 | 70  | 2 |
| 7   | 7 | 35  | 5 |
| 1   |   | 7   | 7 |
|     |   | 1   |   |

$$h) \frac{1.200}{800}$$

$$\frac{1.200}{800} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 \cdot 5}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot 5} = \frac{3}{2}$$

|       |   |     |   |
|-------|---|-----|---|
| 1.200 | 2 | 800 | 2 |
| 600   | 2 | 400 | 2 |
| 300   | 2 | 200 | 2 |
| 150   | 2 | 100 | 2 |
| 75    | 3 | 50  | 2 |
| 25    | 5 | 25  | 5 |
| 5     | 5 | 5   | 5 |
| 1     |   | 1   |   |

$$i) \frac{900}{5.000}$$

$$\frac{900}{5.000} = \frac{2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5}{2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 5 \cdot 5} = \frac{9}{50}$$

|     |   |       |   |
|-----|---|-------|---|
| 900 | 2 | 5.000 | 2 |
| 450 | 2 | 2.500 | 2 |
| 225 | 3 | 1.250 | 2 |
| 75  | 3 | 625   | 5 |
| 25  | 5 | 125   | 5 |
| 5   | 5 | 25    | 5 |
| 1   |   | 5     | 5 |
|     |   | 1     |   |

j)  $\frac{3.400}{1.800}$

$$\frac{3.400}{1.800} = \frac{2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 17}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5} = \frac{17}{9}$$

|       |    |       |   |
|-------|----|-------|---|
| 3.400 | 2  | 1.800 | 2 |
| 1.700 | 2  | 900   | 2 |
| 850   | 2  | 450   | 2 |
| 425   | 5  | 225   | 3 |
| 85    | 5  | 75    | 3 |
| 17    | 17 | 25    | 5 |
| 1     |    | 5     | 5 |
|       |    | 1     |   |

13.- Compara los siguientes pares de fracciones:

a)  $\frac{9}{5}$  y  $\frac{9}{8}$

$$\frac{9}{5} < \frac{9}{8}$$

b)  $\frac{6}{11}$  y  $\frac{10}{11}$

$$\frac{6}{11} < \frac{10}{11}$$

c)  $\frac{3}{7}$  y  $\frac{3}{4}$

$$\frac{3}{7} < \frac{3}{4}$$

d)  $\frac{6}{19}$  y  $\frac{18}{19}$

$$\frac{6}{19} < \frac{18}{19}$$

e)  $\frac{8}{9}$  y  $\frac{11}{12}$

$$\frac{8}{9} \text{ y } \frac{11}{12} \rightarrow \frac{32}{36} \text{ y } \frac{33}{36} \Rightarrow \frac{32}{36} < \frac{33}{36} \Rightarrow \frac{8}{9} < \frac{11}{12}$$

f)  $\frac{5}{18}$  y  $\frac{11}{24}$

$$\frac{5}{18} \text{ y } \frac{11}{24} \rightarrow \frac{20}{72} \text{ y } \frac{33}{72} \Rightarrow \frac{20}{72} < \frac{33}{72} \Rightarrow \frac{5}{18} < \frac{11}{12}$$

14.- Ordena:

a)  $\frac{7}{22}, \frac{7}{21}, \frac{7}{15}, \frac{7}{14}$ ; *de mayor a menor.*

$$\frac{7}{14} > \frac{7}{15} > \frac{7}{21} > \frac{7}{22}$$

b)  $\frac{5}{11}, \frac{17}{11}, \frac{6}{11}, \frac{18}{11}$ ; *de menor a mayor.*

$$\frac{5}{11} < \frac{6}{11} < \frac{17}{11} < \frac{18}{11}$$

c)  $\frac{7}{8}, \frac{5}{4}, \frac{1}{6}, \frac{2}{9}$ ; *de mayor a menor.*

$$\frac{7}{8}, \frac{5}{4}, \frac{1}{6}, \frac{2}{9} \rightarrow \frac{63}{72}, \frac{90}{72}, \frac{12}{72}, \frac{16}{72} \Rightarrow \frac{90}{72} > \frac{63}{72} > \frac{16}{72} > \frac{12}{72} \Rightarrow \frac{5}{4} > \frac{7}{8} > \frac{2}{9} > \frac{1}{6}$$

d)  $\frac{6}{18}, \frac{13}{21}, \frac{9}{14}, \frac{4}{6}$ ; *de menor a mayor.*

$$\frac{6}{18}, \frac{13}{21}, \frac{9}{14}, \frac{4}{6} \rightarrow \frac{42}{126}, \frac{78}{126}, \frac{81}{126}, \frac{84}{126} \Rightarrow \frac{42}{126} < \frac{78}{126} < \frac{81}{126} < \frac{84}{126} \Rightarrow \frac{6}{18} < \frac{13}{21} < \frac{9}{14} < \frac{4}{6}$$

e)  $\frac{14}{12}, \frac{22}{20}, \frac{7}{5}$ ; *de mayor a menor.*

$$\frac{14}{12}, \frac{22}{20}, \frac{7}{5} \rightarrow \frac{70}{60}, \frac{66}{60}, \frac{84}{60} \Rightarrow \frac{84}{60} > \frac{70}{60} > \frac{66}{60} \Rightarrow \frac{7}{5} > \frac{14}{12} > \frac{22}{20}$$

f)  $\frac{2}{9}, \frac{3}{10}, \frac{4}{15}$ ; *de menor a mayor.*

$$\frac{2}{9}, \frac{3}{10}, \frac{4}{15} \rightarrow \frac{20}{90}, \frac{27}{90}, \frac{24}{90} \Rightarrow \frac{20}{90} < \frac{24}{90} < \frac{27}{90} \Rightarrow \frac{2}{9} < \frac{4}{15} < \frac{3}{10}$$

15.- Escribe una fracción comprendida entre cada uno de los pares siguientes:

a)  $\frac{4}{9}$  y  $\frac{5}{9}$

$$\frac{4}{9} \text{ y } \frac{5}{9} \Leftrightarrow \frac{8}{18} \text{ y } \frac{10}{18} \Rightarrow \frac{4}{9} < \frac{9}{18} < \frac{5}{9}$$

b)  $\frac{13}{25}$  y  $\frac{1}{25}$

$$\frac{13}{25} \text{ y } \frac{1}{25} \Rightarrow \frac{13}{25} > \frac{10}{25} > \frac{1}{25}$$

c)  $\frac{5}{6}$  y  $\frac{17}{20}$

$$\frac{5}{6} \text{ y } \frac{17}{20} \Leftrightarrow \frac{50}{60} \text{ y } \frac{21}{60} \Rightarrow \frac{5}{6} > \frac{41}{60} > \frac{17}{20}$$

f)  $\frac{11}{12}$  y  $\frac{14}{15}$

$$\frac{11}{12} \text{ y } \frac{14}{15} \Leftrightarrow \frac{55}{60} \text{ y } \frac{56}{60} \Leftrightarrow \frac{110}{120} \text{ y } \frac{112}{120} \Rightarrow \frac{110}{120} < \frac{111}{120} < \frac{112}{120} \Rightarrow \frac{11}{12} < \frac{111}{120} < \frac{14}{15}$$

### Operaciones con fracciones

16.- Expresa cada fracción como suma de un número entero y una fracción:

a)  $\frac{18}{7}$

$$\frac{18}{7} = 2\frac{4}{7} = 2 + \frac{4}{7}$$

b)  $\frac{33}{5}$

$$\frac{33}{5} = 6\frac{3}{5} = 6 + \frac{3}{5}$$

c)  $\frac{11}{2}$

$$\frac{11}{2} = 5\frac{1}{2} = 5 + \frac{1}{2}$$

d)  $\frac{43}{4}$        $\frac{43}{4} = 10\frac{3}{4} = 10 + \frac{3}{4}$

e)  $\frac{33}{10}$

$$\frac{33}{10} = 3 \frac{3}{10} = 3 + \frac{3}{10}$$

f)  $\frac{89}{16}$

$$\frac{89}{16} = 5 \frac{9}{16} = 5 + \frac{9}{16}$$

17.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

a)  $\frac{3}{12} - \frac{4}{8} - \frac{5}{4} + \frac{7}{3}$

$$\frac{3}{12} - \frac{4}{8} - \frac{5}{4} + \frac{7}{3} = \frac{6}{24} - \frac{12}{24} - \frac{30}{24} + \frac{56}{24} = \frac{6-12-30+56}{24} = \frac{62-42}{24} = \frac{20}{24} = \frac{5}{6}$$

b)  $\frac{15}{20} - \frac{3}{5} + \frac{7}{4} - \frac{2}{10}$

$$\frac{15}{20} - \frac{3}{5} + \frac{7}{4} - \frac{2}{10} = \frac{15}{20} - \frac{12}{20} + \frac{35}{20} - \frac{4}{20} = \frac{15-12+35-4}{20} = \frac{50-16}{20} = \frac{34}{20} = \frac{17}{10}$$

c)  $2 + \frac{3}{4} - \frac{1}{3} - \frac{1}{2}$

1  $2 + \frac{3}{4} - \frac{1}{3} - \frac{1}{2} = \frac{2}{1} + \frac{3}{4} - \frac{1}{3} - \frac{1}{2} = \frac{24}{12} + \frac{9}{12} - \frac{4}{12} - \frac{6}{12} = \frac{24+9-4-6}{12} = \frac{33-10}{12} = \frac{23}{12}$

2  $2 + \frac{3}{4} - \frac{1}{3} - \frac{1}{2} = \frac{11}{4} - \frac{1}{3} - \frac{1}{2} = \frac{33}{12} - \frac{4}{12} - \frac{6}{12} = \frac{33-4-6}{12} = \frac{33-10}{12} = \frac{23}{12}$

d)  $3 - \frac{1}{2} + \frac{2}{5} - \frac{1}{6}$

1  $3 - \frac{1}{2} + \frac{2}{5} - \frac{1}{6} = \frac{3}{1} - \frac{1}{2} + \frac{2}{5} - \frac{1}{6} = \frac{90}{30} - \frac{15}{30} + \frac{12}{30} - \frac{5}{30} = \frac{90-15+12-5}{30} = \frac{102-20}{30} = \frac{82}{30} = \frac{41}{15}$

2  $3 - \frac{1}{2} + \frac{2}{5} - \frac{1}{6} = \frac{5}{2} + \frac{2}{5} - \frac{1}{6} = \frac{75}{30} + \frac{12}{30} - \frac{5}{30} = \frac{75+12-5}{30} = \frac{87-5}{30} = \frac{82}{30} = \frac{41}{15}$

e)  $\frac{3}{5} - 7 - \frac{9}{10} + \frac{5}{12}$

$$\begin{aligned}\frac{3}{5} - 7 - \frac{9}{10} + \frac{5}{12} &= -7 + \frac{3}{5} - \frac{9}{10} + \frac{5}{12} = -\frac{32}{5} - \frac{9}{10} + \frac{5}{12} = -\frac{384}{60} - \frac{54}{60} + \frac{25}{60} = \frac{-384 - 54 + 25}{60} = \\ &= \frac{25 - 438}{60} = \frac{-413}{60} = -\frac{413}{60}\end{aligned}$$

f)  $23 + \frac{7}{40} - \frac{2}{8} - 22$

$$23 + \frac{7}{40} - \frac{2}{8} - 22 = 23 - 22 + \frac{7}{40} - \frac{2}{8} = 1 + \frac{7}{40} - \frac{2}{8} = \frac{47}{40} - \frac{2}{8} = \frac{47}{40} - \frac{10}{40} = \frac{47 - 10}{40} = \frac{37}{40}$$

g)  $\frac{50}{6} + \frac{3}{15} - 9 + \frac{1}{3}$

$$\begin{aligned}\frac{50}{6} + \frac{3}{15} - 9 + \frac{1}{3} &= -9 + \frac{50}{6} + \frac{3}{15} + \frac{1}{3} = -\frac{4}{6} + \frac{3}{15} + \frac{1}{3} = -\frac{20}{30} + \frac{2}{30} + \frac{10}{30} = \frac{-20 + 6 + 10}{30} = \\ &= \frac{-20 + 16}{30} = \frac{-4}{30} = -\frac{2}{15}\end{aligned}$$

h)  $10 + \frac{15}{24} - 11 + \frac{8}{6}$

$$10 + \frac{15}{24} - 11 + \frac{8}{6} = 10 - 11 + \frac{15}{24} + \frac{8}{6} = -1 + \frac{15}{24} + \frac{8}{6} = -\frac{9}{24} + \frac{8}{6} = -\frac{9}{24} + \frac{32}{24} = \frac{-9 + 32}{24} = \frac{23}{24}$$

i)  $2 - \left( \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right)$

1  $2 - \left( \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right) = 2 - \left( \frac{6}{12} + \frac{4}{12} + \frac{3}{12} \right) = 2 - \frac{6+4+3}{12} = 2 - \frac{13}{12} = \frac{24-13}{12} = \frac{11}{12}$

2  $2 - \left( \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right) = 2 - \frac{1}{2} - \frac{1}{3} - \frac{1}{4} = \frac{3}{2} - \frac{1}{3} - \frac{1}{4} = \frac{18}{12} - \frac{4}{12} - \frac{3}{12} = \frac{18-4-3}{12} = \frac{18-7}{12} = \frac{11}{12}$

j)  $\left( 1 - \frac{1}{4} \right) + \left( 1 - \frac{1}{5} \right) + \left( 1 - \frac{1}{6} \right)$

1  $\left( 1 - \frac{1}{4} \right) + \left( 1 - \frac{1}{5} \right) + \left( 1 - \frac{1}{6} \right) = \frac{3}{4} + \frac{4}{5} + \frac{5}{6} = \frac{45}{60} + \frac{48}{60} + \frac{50}{60} = \frac{45+48+50}{60} = \frac{143}{60}$

$$\begin{aligned}
& \left(1 - \frac{1}{4}\right) + \left(1 - \frac{1}{5}\right) + \left(1 - \frac{1}{6}\right) = 1 - \frac{1}{4} + 1 - \frac{1}{5} + 1 - \frac{1}{6} = 3 - \frac{1}{4} - \frac{1}{5} - \frac{1}{6} = \frac{11}{4} - \frac{1}{5} - \frac{1}{6} \rightarrow \\
& \xrightarrow{\substack{15 \\ 12 \\ 10}} \frac{165}{60} - \frac{12}{60} - \frac{10}{60} = \frac{165 - 12 - 10}{60} = \frac{165 - 22}{60} = \frac{143}{60}
\end{aligned}$$

k)  $2 - \left(\frac{1}{4} + \frac{1}{5}\right)$

$$1 \quad 2 - \left(\frac{1}{4} + \frac{1}{5}\right) = 2 - \left(\frac{\frac{5}{20}}{\frac{4}{20}} + \frac{\frac{4}{20}}{\frac{5}{20}}\right) = 2 - \frac{5+4}{20} = 2 - \frac{9}{20} = \frac{40-9}{20} = \frac{31}{20}$$

$$2 \quad 2 - \left(\frac{1}{4} + \frac{1}{5}\right) = 2 - \frac{1}{4} - \frac{1}{5} = \frac{7}{4} - \frac{1}{5} = \frac{\frac{35}{20}}{\frac{4}{20}} - \frac{4}{20} = \frac{35-4}{20} = \frac{31}{20}$$

l)  $\left(\frac{1}{3} + \frac{2}{5}\right) - \left(\frac{1}{4} + \frac{1}{6}\right)$

$$\begin{aligned}
1 \quad \left(\frac{1}{3} + \frac{2}{5}\right) - \left(\frac{1}{4} + \frac{1}{6}\right) &= \left(\frac{\frac{5}{15}}{\frac{3}{15}} + \frac{\frac{6}{15}}{\frac{5}{15}}\right) - \left(\frac{\frac{3}{12}}{\frac{4}{12}} + \frac{\frac{2}{12}}{\frac{6}{12}}\right) = \frac{5+6}{15} - \frac{3+2}{12} = \frac{11}{15} - \frac{5}{12} = \frac{\frac{44}{60}}{\frac{25}{60}} = \\
&= \frac{44-25}{60} = \frac{19}{60}
\end{aligned}$$

$$\begin{aligned}
2 \quad \left(\frac{1}{3} + \frac{2}{5}\right) - \left(\frac{1}{4} + \frac{1}{6}\right) &= \frac{1}{3} + \frac{2}{5} - \frac{1}{4} - \frac{1}{6} = \frac{\frac{20}{60}}{\frac{12}{60}} + \frac{\frac{24}{60}}{\frac{15}{60}} - \frac{15}{60} - \frac{10}{60} = \frac{20+24-15-10}{60} = \frac{44-25}{60} = \\
&= \frac{19}{60}
\end{aligned}$$

m)  $\left(1 - \frac{1}{10}\right) + \left(2 + \frac{3}{4}\right)$

$$1 \quad \left(1 - \frac{1}{10}\right) + \left(2 + \frac{3}{4}\right) = \frac{9}{10} + \frac{11}{4} = \frac{\frac{18}{20}}{\frac{55}{20}} = \frac{18+55}{20} = \frac{73}{20}$$

$$2 \quad \left(1 - \frac{1}{10}\right) + \left(2 + \frac{3}{4}\right) = 1 - \frac{1}{10} + 2 + \frac{3}{4} = 3 - \frac{1}{10} + \frac{3}{4} = \frac{29}{10} + \frac{3}{4} = \frac{\frac{58}{20}}{\frac{15}{20}} = \frac{58+15}{20} = \frac{73}{20}$$

n)  $2 + \frac{1}{3} - \left(1 + \frac{1}{16}\right)$

$$1 \quad 2 + \frac{1}{3} - \left(1 + \frac{1}{16}\right) = 2 + \frac{1}{3} - \frac{17}{16} = \frac{2}{1} + \frac{1}{3} - \frac{17}{16} = \frac{\frac{96}{48}}{\frac{16}{48}} - \frac{51}{48} = \frac{96+16-51}{48} = \frac{112-51}{48} = \frac{61}{48}$$

$$2 \quad 2 + \frac{1}{3} - \left(1 + \frac{1}{16}\right) = 2 + \frac{1}{3} - 1 - \frac{1}{16} = 1 + \frac{1}{3} - \frac{1}{16} = \frac{1}{1} + \frac{1}{3} - \frac{1}{16} = \frac{48}{48} + \frac{16}{48} - \frac{3}{48} = \frac{48+16-3}{48} = \frac{61}{48}$$

$$3 \quad 2 + \frac{1}{3} - \left(1 + \frac{1}{16}\right) = \frac{7}{3} - \frac{17}{16} = \frac{112}{48} - \frac{51}{48} = \frac{112-51}{48} = \frac{61}{48}$$

$$4 \quad 2 + \frac{1}{3} - \left(1 + \frac{1}{16}\right) = 2 + \frac{1}{3} - 1 - \frac{1}{16} = 1 + \frac{1}{3} - \frac{1}{16} = \frac{4}{3} - \frac{1}{16} = \frac{64}{48} - \frac{3}{48} = \frac{64-3}{48} = \frac{61}{48}$$

18.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

a)  $\frac{7}{3} \cdot \frac{6}{8}$

$$\frac{7}{3} \cdot \frac{6}{8} = \frac{42}{24} = \frac{7}{4}$$

b)  $\frac{1}{12} \cdot 9$

$$\frac{1}{12} \cdot 9 = \frac{9}{12} = \frac{3}{4}$$

c)  $\frac{4}{5} \cdot \frac{8}{10}$

$$\frac{4}{5} \cdot \frac{8}{10} = \frac{32}{50} = \frac{16}{25}$$

d)  $7 \cdot \frac{5}{28}$

$$7 \cdot \frac{5}{28} = \frac{35}{28} = \frac{5}{4}$$

e)  $\frac{9}{8} \cdot \frac{2}{15} \cdot \frac{10}{6}$

$$\frac{9}{8} \cdot \frac{2}{15} \cdot \frac{10}{6} = \frac{9 \cdot 2 \cdot 10}{8 \cdot 15 \cdot 6} = \frac{180}{720} = \frac{1}{4}$$

f)  $\frac{8}{5} \cdot \frac{10}{4} \cdot \frac{1}{3} \quad \frac{8}{5} \cdot \frac{10}{4} \cdot \frac{1}{3} = \frac{80}{60} = \frac{4}{3}$

$$g) -\frac{3}{10} \cdot \left(-\frac{20}{9}\right)$$

$$-\frac{3}{10} \cdot \left(-\frac{20}{9}\right) = \frac{60}{90} = \frac{2}{3}$$

$$h) \frac{18}{4} \cdot \left(-\frac{8}{9}\right) \cdot \frac{1}{2}$$

$$\frac{18}{4} \cdot \left(-\frac{8}{9}\right) \cdot \frac{1}{2} = -\frac{144}{72} = -2$$

19.- Calcula, aplicando la propiedad distributiva:

$$a) \frac{2}{3} \cdot \left(\frac{3}{5} + \frac{1}{10}\right)$$

$$\frac{2}{3} \cdot \left(\frac{3}{5} + \frac{1}{10}\right) = \frac{2}{3} \cdot \frac{3}{5} + \frac{2}{3} \cdot \frac{1}{10} = \frac{6}{15} + \frac{2}{30} = \frac{12}{30} + \frac{2}{30} = \frac{14}{30} = \frac{7}{15}$$

$$b) \frac{7}{4} \cdot \left(\frac{1}{2} + \frac{3}{7} - \frac{2}{5}\right)$$

$$\begin{aligned} \frac{7}{4} \cdot \left(\frac{1}{2} + \frac{3}{7} - \frac{2}{5}\right) &= \frac{7}{4} \cdot \frac{1}{2} + \frac{7}{4} \cdot \frac{3}{7} - \frac{7}{4} \cdot \frac{2}{5} = \frac{7}{8} + \frac{21}{28} - \frac{14}{20} = \frac{245}{280} + \frac{10}{280} - \frac{14}{280} = \frac{245 + 210 - 196}{280} = \\ &= \frac{455 - 196}{280} = \frac{259}{280} = \frac{37}{40} \end{aligned}$$

20.- Calcula, sacando factor común:

$$a) \frac{3}{5} \cdot \frac{6}{7} - \frac{3}{5} \cdot \frac{1}{4}$$

$$\frac{3}{5} \cdot \frac{6}{7} - \frac{3}{5} \cdot \frac{1}{4} = \frac{3}{5} \cdot \left(\frac{6}{7} - \frac{1}{4}\right) = \frac{3}{5} \cdot \left(\frac{24}{28} - \frac{7}{28}\right) = \frac{3}{5} \cdot \frac{17}{28} = \frac{51}{140}$$

$$b) \frac{2}{7} \cdot \frac{3}{4} - \frac{1}{5} \cdot \frac{3}{4} + \frac{3}{8} \cdot \frac{3}{4}$$

$$\begin{aligned} \frac{2}{7} \cdot \frac{3}{4} - \frac{1}{5} \cdot \frac{3}{4} + \frac{3}{8} \cdot \frac{3}{4} &= \frac{3}{4} \cdot \left(\frac{2}{7} - \frac{1}{5} + \frac{3}{8}\right) = \frac{3}{4} \cdot \left(\frac{80}{280} - \frac{56}{280} + \frac{105}{280}\right) = \frac{3}{4} \cdot \frac{80 - 56 + 105}{280} = \\ &= \frac{3}{4} \cdot \frac{185 - 56}{280} = \frac{3}{4} \cdot \frac{129}{280} = \frac{387}{1120} \end{aligned}$$

21.- Calcula:

a)  $\left(\frac{7}{9}\right)^2$

$$\left(\frac{7}{9}\right)^2 = \frac{7^2}{9^2} = \frac{\mathbf{49}}{\mathbf{81}}$$

b)  $\left(-\frac{6}{5}\right)^2$

$$\left(-\frac{6}{5}\right)^2 = \frac{6^2}{5^2} = \frac{\mathbf{36}}{\mathbf{25}}$$

c)  $\left(\frac{3}{4}\right)^3$

$$\left(\frac{3}{4}\right)^3 = \frac{3^3}{4^3} = \frac{\mathbf{27}}{\mathbf{64}}$$

d)  $\left(-\frac{2}{3}\right)^3$

$$\left(-\frac{2}{3}\right)^3 = -\frac{2^3}{3^3} = -\frac{\mathbf{8}}{\mathbf{27}}$$

e)  $\left(\frac{1}{2}\right)^5$

$$\left(\frac{1}{2}\right)^5 = \frac{1^5}{2^5} = \frac{\mathbf{1}}{\mathbf{32}}$$

f)  $\left(-\frac{1}{2}\right)^4$

$$\left(-\frac{1}{2}\right)^4 = \frac{1^4}{2^4} = \frac{\mathbf{1}}{\mathbf{16}}$$

g)  $\left(\frac{5}{11}\right)^6$

$$\left(\frac{5}{11}\right)^6 = \frac{\mathbf{5^6}}{\mathbf{11^6}}$$

h)  $\left(-\frac{5}{7}\right)^2$

$$\left(-\frac{5}{7}\right)^2 = \frac{5^2}{7^2} = \frac{25}{49}$$

22.- Escribe la fracción inversa de:

a)  $\frac{-5}{8}$

$$\text{inv}\left(-\frac{5}{8}\right) = -\frac{8}{5}$$

b)  $\frac{16}{5}$

$$\text{inv}\left(\frac{16}{5}\right) = \frac{5}{16}$$

c)  $\frac{15}{-23}$

$$\text{inv}\left(-\frac{15}{23}\right) = -\frac{23}{15}$$

d) 35

$$\text{inv}(35) = \frac{1}{35}$$

23.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

a)  $\frac{16}{3} : \frac{4}{6}$

$$\frac{16}{3} : \frac{4}{6} = \frac{96}{12} = 8$$

b)  $10 : \frac{4}{5}$

$$10 : \frac{4}{5} = \frac{50}{4} = \frac{25}{2}$$

c)  $\frac{7}{2} : 14$        $\frac{7}{2} : 14 = \frac{7}{28} = \frac{1}{4}$

$$d) \frac{12}{21} : \frac{4}{7}$$

$$\frac{12}{21} : \frac{4}{7} = \frac{84}{84} = 1$$

$$e) \frac{16}{15} : \left(-\frac{4}{5}\right)$$

$$\frac{16}{15} : \left(-\frac{4}{5}\right) = -\frac{80}{60} = -\frac{4}{3}$$

$$f) -\frac{14}{20} : \left(-\frac{21}{10}\right)$$

$$-\frac{14}{20} : \left(-\frac{21}{10}\right) = \frac{140}{420} = \frac{1}{3}$$

### Operaciones combinadas con fracciones

24.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

$$a) \frac{2}{5} : \frac{3}{4} + \frac{1}{2}$$

$$\frac{2}{5} : \frac{3}{4} + \frac{1}{2} = \frac{8}{15} + \frac{1}{2} = \frac{16}{30} + \frac{15}{30} = \frac{16+15}{30} = \frac{31}{30}$$

$$b) 4 - \frac{5}{6} : \frac{4}{3}$$

$$4 - \frac{5}{6} : \frac{4}{3} = 4 - \frac{15}{24} = \frac{96-15}{24} = \frac{81}{24} = \frac{27}{8}$$

$$c) -\frac{7}{2} - \frac{9}{2} : \left(-\frac{8}{3}\right)$$

$$-\frac{7}{2} - \frac{9}{2} : \left(-\frac{8}{3}\right) = -\frac{7}{2} + \frac{27}{16} = -\frac{56}{16} + \frac{27}{16} = \frac{-56+27}{16} = \frac{-29}{16} = -\frac{29}{16}$$

$$d) -\frac{1}{3} + \frac{7}{2} : \left(-\frac{6}{9}\right)$$

$$-\frac{1}{3} + \frac{7}{2} : \left(-\frac{6}{9}\right) = -\frac{1}{3} - \frac{63}{12} = -\frac{4}{12} - \frac{63}{12} = \frac{-4-63}{12} = -\frac{67}{12}$$

$$\text{e) } \frac{2}{5} \cdot \left(-\frac{4}{3}\right) - \frac{1}{9}$$

$$\frac{2}{5} \cdot \left(-\frac{4}{3}\right) - \frac{1}{9} = -\frac{8}{15} - \frac{1}{9} = -\frac{24}{45} - \frac{5}{45} = \frac{-24-5}{45} = \frac{-29}{45} = -\frac{29}{45}$$

$$\text{f) } -\frac{7}{12} \cdot \left(-\frac{3}{2}\right) - 5$$

$$-\frac{7}{12} \cdot \left(-\frac{3}{2}\right) - 5 = \frac{21}{24} - 5 = \frac{21-120}{24} = \frac{-99}{24} = -\frac{33}{8}$$

$$\text{g) } -\frac{5}{9} \cdot \frac{3}{2} + \frac{1}{4} : \left(-\frac{3}{8}\right)$$

$$-\frac{5}{9} \cdot \frac{3}{2} + \frac{1}{4} : \left(-\frac{3}{8}\right) = -\frac{15}{18} - \frac{8}{12} = -\frac{30}{36} - \frac{24}{36} = \frac{-30-24}{36} = \frac{-54}{36} = -\frac{3}{2}$$

$$\text{h) } \frac{5}{4} \cdot \left(-\frac{3}{2}\right) + \left(-\frac{1}{6}\right) : \frac{3}{7}$$

$$\frac{5}{4} \cdot \left(-\frac{3}{2}\right) + \left(-\frac{1}{6}\right) : \frac{3}{7} = -\frac{15}{8} - \frac{7}{18} = -\frac{135}{72} - \frac{28}{72} = \frac{-135-28}{72} = \frac{-163}{72} = -\frac{163}{72}$$

$$\text{i) } \frac{4}{7} : \frac{1}{2} + \frac{3}{4} \cdot \frac{2}{7}$$

$$\frac{4}{7} : \frac{1}{2} + \frac{3}{4} \cdot \frac{2}{7} = \frac{8}{7} + \frac{6}{28} = \frac{32}{28} + \frac{6}{28} = \frac{32+6}{28} = \frac{38}{28} = \frac{19}{14}$$

$$\text{j) } \frac{3}{4} + \frac{1}{2} : 3 - \frac{2}{7} \cdot \frac{1}{6}$$

$$\frac{3}{4} + \frac{1}{2} : 3 - \frac{2}{7} \cdot \frac{1}{6} = \frac{3}{4} + \frac{1}{6} - \frac{2}{42} = \frac{63}{84} + \frac{14}{84} - \frac{4}{84} = \frac{63+14-4}{84} = \frac{77-4}{84} = \frac{73}{84}$$

$$\text{k) } 2\frac{2}{5} + \frac{3}{2} \cdot \frac{2}{4} - 1$$

$$2\frac{2}{5} + \frac{3}{2} \cdot \frac{2}{4} - 1 = \frac{12}{5} + \frac{6}{8} - 1 = \frac{12}{5} + \frac{6-8}{8} = \frac{12}{5} - \frac{2}{8} = \frac{96}{40} - \frac{10}{40} = \frac{86}{40} = \frac{43}{20}$$

$$l) \frac{1}{2} \cdot \frac{2}{3} - \frac{1}{5} + \frac{3}{4} - \frac{2}{5} \cdot \frac{1}{3}$$

$$\frac{1}{2} \cdot \frac{2}{3} - \frac{1}{5} + \frac{3}{4} - \frac{2}{5} \cdot \frac{1}{3} = \frac{2}{6} - \frac{1}{5} + \frac{3}{4} - \frac{2}{15} = \frac{20}{60} - \frac{12}{60} + \frac{45}{60} - \frac{8}{60} = \frac{20-12+45-8}{60} = \frac{65-20}{60} = \frac{45}{60} = \frac{3}{4}$$

25.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

$$a) -\frac{6}{8} + \frac{2}{7} \cdot \left(-\frac{5}{4} + \frac{3}{2}\right)$$

$$-\frac{6}{8} + \frac{2}{7} \cdot \left(-\frac{5}{4} + \frac{3}{2}\right) = -\frac{6}{8} + \frac{2}{7} \cdot \left(-\frac{5}{4} + \frac{6}{4}\right) = -\frac{6}{8} + \frac{2}{7} \cdot \left(\frac{-5+6}{4}\right) = -\frac{6}{8} + \frac{2}{7} \cdot \frac{1}{4} = -\frac{6}{8} + \frac{2}{28} = -\frac{42}{56} + \frac{4}{56} = \frac{-42+4}{56} = \frac{-38}{56} = -\frac{19}{28}$$

$$b) \frac{9}{12} - \left[-\frac{1}{6} - \frac{1}{4} \cdot \left(-\frac{5}{2}\right)\right]$$

$$\frac{9}{12} - \left[-\frac{1}{6} - \frac{1}{4} \cdot \left(-\frac{5}{2}\right)\right] = \frac{9}{12} - \left(-\frac{1}{6} + \frac{5}{8}\right) = \frac{9}{12} + \frac{1}{6} - \frac{5}{8} = \frac{18}{24} + \frac{4}{24} - \frac{15}{24} = \frac{18+4-15}{24} = \frac{22-15}{24} = \frac{7}{24}$$

$$c) \frac{7}{2} - \frac{1}{2} \cdot \left(3 - \frac{12}{10}\right)$$

$$\frac{7}{2} - \frac{1}{2} \cdot \left(3 - \frac{12}{10}\right) = \frac{7}{2} - \frac{1}{2} \cdot \frac{30-12}{10} = \frac{7}{2} - \frac{1}{2} \cdot \frac{18}{10} = \frac{7}{2} - \frac{18}{20} = \frac{70}{20} - \frac{18}{20} = \frac{52}{20} = \frac{13}{5}$$

$$d) -\frac{4}{15} - \left(\frac{7}{6} - \frac{1}{2}\right)$$

$$-\frac{4}{15} - \left(\frac{7}{6} - \frac{1}{2}\right) = -\frac{4}{15} - \left(\frac{7}{6} - \frac{3}{6}\right) = -\frac{4}{15} - \frac{4}{6} = -\frac{4}{15} - \frac{10}{15} = -\frac{14}{15}$$

$$e) \frac{4}{18} \cdot \left(1 - \frac{5}{2}\right) : \frac{3}{7}$$

$$\frac{4}{18} \cdot \left(1 - \frac{5}{2}\right) : \frac{3}{7} = \frac{4}{18} \cdot \left(\frac{2-5}{2}\right) : \frac{3}{7} = \frac{4}{18} \cdot \left(-\frac{3}{2}\right) : \frac{3}{7} = -\frac{12}{36} : \frac{3}{7} = -\frac{84}{108} = -\frac{7}{9}$$

$$f) -\frac{1}{3} \cdot \left[ 2 - \left( \frac{6}{4} - \frac{5}{3} \right) \right]$$

$$\begin{aligned} -\frac{1}{3} \cdot \left[ 2 - \left( \frac{6}{4} - \frac{5}{3} \right) \right] &= -\frac{1}{3} \cdot \left[ 2 - \left( \frac{3}{12} \cdot \frac{18}{12} - \frac{4}{12} \cdot \frac{20}{12} \right) \right] = -\frac{1}{3} \cdot \left[ 2 - \left( \frac{18-20}{12} \right) \right] = -\frac{1}{3} \cdot \left[ 2 - \left( -\frac{2}{12} \right) \right] = \\ &= -\frac{1}{3} \cdot \left( 2 + \frac{2}{12} \right) = -\frac{1}{3} \cdot \frac{24+2}{12} = -\frac{1}{3} \cdot \frac{26}{12} = -\frac{26}{36} = -\frac{\mathbf{13}}{\mathbf{18}} \end{aligned}$$

$$g) \frac{9}{6} \cdot \left( \frac{3}{5} - \frac{7}{4} \right) + \frac{1}{2}$$

$$\begin{aligned} \frac{9}{6} \cdot \left( \frac{3}{5} - \frac{7}{4} \right) + \frac{1}{2} &= \frac{9}{6} \cdot \left( \frac{4}{20} \cdot \frac{12}{20} - \frac{5}{20} \cdot \frac{35}{20} \right) + \frac{1}{2} = \frac{9}{6} \cdot \left( \frac{12-35}{20} \right) + \frac{1}{2} = \frac{9}{6} \cdot \left( -\frac{23}{20} \right) + \frac{1}{2} = -\frac{207}{120} + \frac{1}{2} = \\ &= -\frac{207}{120} + \frac{60}{120} = \frac{-207+60}{120} = \frac{-147}{120} = -\frac{\mathbf{49}}{\mathbf{40}} \end{aligned}$$

$$h) -\frac{1}{2} - \left( -\frac{1}{4} \cdot \frac{5}{2} + \frac{9}{14} \right)$$

$$\begin{aligned} -\frac{1}{2} - \left( -\frac{1}{4} \cdot \frac{5}{2} + \frac{9}{14} \right) &= -\frac{1}{2} - \left( -\frac{5}{8} + \frac{9}{14} \right) = -\frac{1}{2} + \frac{5}{8} - \frac{9}{14} = -\frac{28}{56} + \frac{7}{56} - \frac{36}{56} = \frac{-28+35-36}{56} = \\ &= \frac{35-64}{56} = \frac{-29}{56} = -\frac{\mathbf{29}}{\mathbf{56}} \end{aligned}$$

$$i) 3 : \left( \frac{8}{5} - \frac{1}{7} : 2 \right)$$

$$3 : \left( \frac{8}{5} - \frac{1}{7} : 2 \right) = 3 : \left( \frac{8}{5} - \frac{1}{14} \right) = 3 : \left( \frac{14}{70} - \frac{5}{70} \right) = 3 : \frac{112-5}{70} = 3 : \frac{107}{70} = \frac{\mathbf{210}}{\mathbf{107}}$$

$$j) 3 : \left( \frac{1}{2} + \frac{3}{8} \right) - \frac{2}{9}$$

$$\begin{aligned} 3 : \left( \frac{1}{2} + \frac{3}{8} \right) - \frac{2}{9} &= 3 : \left( \frac{4}{8} + \frac{3}{8} \right) - \frac{2}{9} = 3 : \frac{4+3}{8} - \frac{2}{9} = 3 : \frac{7}{8} - \frac{2}{9} = \frac{24}{7} - \frac{2}{9} = \frac{216}{63} - \frac{14}{63} = \\ &= \frac{216-14}{63} = \frac{\mathbf{202}}{\mathbf{63}} \end{aligned}$$

$$\text{k) } 5 - \left( \frac{2}{3} + \frac{2}{7} \right) : \frac{1}{4} + \frac{7}{5} \cdot \frac{2}{3}$$

$$\begin{aligned} 5 - \left( \frac{2}{3} + \frac{2}{7} \right) : \frac{1}{4} + \frac{7}{5} \cdot \frac{2}{3} &= 5 - \left( \frac{14}{21} + \frac{6}{21} \right) : \frac{1}{4} + \frac{7}{5} \cdot \frac{2}{3} = 5 - \frac{14+6}{21} : \frac{1}{4} + \frac{7}{5} \cdot \frac{2}{3} = 5 - \frac{20}{21} : \frac{1}{4} + \frac{7}{5} \cdot \frac{2}{3} = \\ &= 5 - \frac{80}{21} + \frac{14}{15} = \frac{105-80}{21} + \frac{14}{15} = \frac{25}{21} + \frac{14}{15} = \frac{125}{105} + \frac{98}{105} = \frac{125+98}{105} = \frac{223}{105} \end{aligned}$$

$$\text{l) } \left( \frac{3}{2} + \frac{1}{4} \right) : \left( \frac{5}{6} - \frac{1}{3} \right)$$

$$\left( \frac{3}{2} + \frac{1}{4} \right) : \left( \frac{5}{6} - \frac{1}{3} \right) = \left( \frac{6}{4} + \frac{1}{4} \right) : \left( \frac{5}{6} - \frac{2}{6} \right) = \frac{6+1}{4} : \frac{5-2}{6} = \frac{7}{4} : \frac{3}{6} = \frac{42}{12} = \frac{7}{2}$$

26.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

$$\text{a) } -\frac{3}{8} - \left( -\frac{1}{4} \right)^2$$

$$-\frac{3}{8} - \left( -\frac{1}{4} \right)^2 = -\frac{3}{8} - \left( \frac{1}{4} \right)^2 = -\frac{3}{8} - \frac{1^2}{4^2} = -\frac{3}{8} - \frac{1}{16} = -\frac{6}{16} - \frac{1}{16} = \frac{-6-1}{16} = \frac{-7}{16} = -\frac{7}{16}$$

$$\text{b) } \left( \frac{3}{2} \right)^2 \cdot \left( \frac{1}{2} \right)^2 - \frac{10}{8}$$

$$\left( \frac{3}{2} \right)^2 \cdot \left( \frac{1}{2} \right)^2 - \frac{10}{8} = \frac{3^2}{2^2} \cdot \frac{1^2}{2^2} - \frac{10}{8} = \frac{9}{4} \cdot \frac{1}{4} - \frac{10}{8} = \frac{9}{16} - \frac{10}{8} = \frac{9}{16} - \frac{20}{16} = \frac{9-20}{16} = \frac{-11}{16} = -\frac{11}{16}$$

$$\text{c) } 3 + \frac{8}{7} : \left( -\frac{2}{3} \right)^3$$

$$3 + \frac{8}{7} : \left( -\frac{2}{3} \right)^3 = 3 + \frac{8}{7} : \left( -\frac{2^3}{3^3} \right) = 3 + \frac{8}{7} : \left( -\frac{8}{27} \right) = 3 - \frac{216}{56} = \frac{3 \cdot 56 - 216}{56} = \frac{168 - 216}{56} = \frac{-48}{56} = -\frac{6}{7}$$

$$\text{d) } \frac{5}{8} + \left( -\frac{3}{2} \right)^2 \cdot \frac{7}{2}$$

$$\frac{5}{8} + \left( -\frac{3}{2} \right)^2 \cdot \frac{7}{2} = \frac{5}{8} + \frac{3^2}{2^2} \cdot \frac{7}{2} = \frac{5}{8} + \frac{9}{4} \cdot \frac{7}{2} = \frac{5}{8} + \frac{63}{8} = \frac{5+63}{8} = \frac{68}{8} = \frac{17}{2}$$

$$\text{e) } \frac{1}{7} : \frac{1}{5} - \left(-\frac{3}{7}\right)^2$$

$$\frac{1}{7} : \frac{1}{5} - \left(-\frac{3}{7}\right)^2 = \frac{5}{7} - \frac{3^2}{7^2} = \frac{5}{7} - \frac{9}{49} = \frac{35}{49} - \frac{9}{49} = \frac{35-9}{49} = \frac{26}{49}$$

$$\text{f) } -\frac{11}{24} + \left(-\frac{3}{2}\right)^2 - 1$$

$$-\frac{11}{24} + \left(-\frac{3}{2}\right)^2 - 1 = -\frac{11}{24} + \frac{3^2}{2^2} - 1 = -\frac{11}{24} + \frac{9}{4} - 1 = -\frac{11}{24} + \frac{9-4}{4} = -\frac{11}{24} + \frac{5}{4} = -\frac{11}{24} + \frac{30}{24} = \frac{-11+30}{24} = \frac{19}{24}$$

$$\text{g) } \left(-\frac{1}{2}\right)^3 \cdot \frac{4}{3} + \frac{5}{12}$$

$$\left(-\frac{1}{2}\right)^3 \cdot \frac{4}{3} + \frac{5}{12} = -\frac{1^3}{2^3} \cdot \frac{4}{3} + \frac{5}{12} = -\frac{1}{8} \cdot \frac{4}{3} + \frac{5}{12} = -\frac{4}{24} + \frac{5}{12} = -\frac{4}{24} + \frac{10}{24} = \frac{-4+10}{24} = \frac{6}{24} = \frac{1}{4}$$

$$\text{h) } \left(-\frac{3}{4} + 1\right)^2 + \frac{5}{6} \cdot \left(-\frac{7}{8}\right)$$

$$\left(-\frac{3}{4} + 1\right)^2 + \frac{5}{6} \cdot \left(-\frac{7}{8}\right) = \left(\frac{-3+4}{4}\right)^2 - \frac{35}{48} = \left(\frac{1}{4}\right)^2 - \frac{35}{48} = \frac{1^2}{4^2} - \frac{35}{48} = \frac{1}{16} - \frac{35}{48} = \frac{3}{48} - \frac{35}{48} = -\frac{32}{48} = -\frac{2}{3}$$

$$\text{i) } 2 - \left(-\frac{7}{4}\right)^2 + \left(-\frac{5}{8}\right)$$

$$2 - \left(-\frac{7}{4}\right)^2 + \left(-\frac{5}{8}\right) = 2 - \frac{7^2}{4^2} - \frac{5}{8} = 2 - \frac{49}{16} - \frac{5}{8} = \frac{32-49}{16} - \frac{5}{8} = -\frac{17}{16} - \frac{5}{8} = -\frac{17}{16} - \frac{10}{16} = \frac{-17-10}{16} = \frac{-27}{16} = -\frac{27}{16}$$

$$\text{j) } \left(-\frac{1}{2}\right)^4 + \frac{5}{16} - \left(\frac{3}{4}\right)^2$$

$$\left(-\frac{1}{2}\right)^4 + \frac{5}{16} - \left(\frac{3}{4}\right)^2 = \frac{1^4}{2^4} + \frac{5}{16} - \frac{3^2}{4^2} = \frac{1}{16} + \frac{5}{16} - \frac{9}{16} = \frac{1+5-9}{16} = \frac{6-9}{16} = \frac{-3}{16} = -\frac{3}{16}$$

27.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

$$a) \frac{4}{3} : \frac{1}{2} - \frac{32}{5} : 2 + 2 \cdot \frac{3}{4} + 1 + 2 \cdot \frac{1}{6}$$

$$\begin{aligned} \frac{4}{3} : \frac{1}{2} - \frac{32}{5} : 2 + 2 \cdot \frac{3}{4} + 1 + 2 \cdot \frac{1}{6} &= \frac{8}{3} - \frac{32}{10} + \frac{6}{4} + 1 + \frac{2}{6} = \frac{8}{3} - \frac{32}{10} + \frac{6}{4} + \frac{8}{6} = \\ &= \frac{160}{60} - \frac{192}{60} + \frac{90}{60} + \frac{80}{60} = \frac{160 - 192 + 90 + 80}{60} = \frac{330 - 192}{60} = \frac{138}{60} = \frac{23}{10} \end{aligned}$$

$$b) \left( \frac{3}{12} + \frac{4}{6} \right) \cdot \frac{2}{5} - \frac{7}{5} \cdot \left( 2 - 2 \cdot \frac{4}{9} \right) + \frac{4}{3} : 8$$

$$\begin{aligned} \left( \frac{3}{12} + \frac{4}{6} \right) \cdot \frac{2}{5} - \frac{7}{5} \cdot \left( 2 - 2 \cdot \frac{4}{9} \right) + \frac{4}{3} : 8 &= \left( \frac{1}{4} + \frac{2}{3} \right) \cdot \frac{2}{5} - \frac{7}{5} \cdot \left( 2 - \frac{8}{9} \right) + \frac{4}{24} = \\ &= \frac{11}{12} \cdot \frac{2}{5} - \frac{7}{5} \cdot \frac{10}{9} + \frac{4}{24} = \frac{22}{60} - \frac{70}{45} + \frac{4}{24} = \frac{132}{360} - \frac{560}{360} + \frac{60}{360} = \\ &= \frac{132 - 560 + 60}{360} = \frac{192 - 560}{360} = \frac{-368}{360} = -\frac{46}{45} \end{aligned}$$

$$c) \frac{2}{3} - \left[ \frac{5}{2} - \frac{1}{4} \cdot \left( \frac{3}{2} - \frac{1}{6} \right) \right] + \frac{1}{3} : \frac{2}{5} \cdot \frac{6}{5}$$

$$\begin{aligned} \frac{2}{3} - \left[ \frac{5}{2} - \frac{1}{4} \cdot \left( \frac{3}{2} - \frac{1}{6} \right) \right] + \frac{1}{3} : \frac{2}{5} \cdot \frac{6}{5} &= \frac{2}{3} - \left[ \frac{5}{2} - \frac{1}{4} \cdot \left( \frac{9}{6} - \frac{1}{6} \right) \right] + \frac{5}{6} \cdot \frac{6}{5} = \\ &= \frac{2}{3} - \left( \frac{5}{2} - \frac{1}{4} \cdot \frac{8}{6} \right) + \frac{30}{30} = \frac{2}{3} - \left( \frac{5}{2} - \frac{8}{24} \right) + 1 = \frac{2}{3} - \left( \frac{60}{24} - \frac{8}{24} \right) + 1 = \\ &= \frac{2}{3} - \frac{52}{24} + 1 = 1 + \frac{2}{3} - \frac{52}{24} = \frac{5}{3} - \frac{52}{24} = \frac{40}{24} - \frac{52}{24} = \frac{40 - 52}{24} = \frac{-12}{24} = -\frac{1}{2} \end{aligned}$$

$$d) \frac{3}{5} : 2 - 2 \cdot \frac{3}{4} \cdot \left[ \frac{7}{6} - \frac{1}{3} \cdot \left( \frac{1}{2} + 2 \right) \right]^2$$

$$\begin{aligned} \frac{3}{5} : 2 - 2 \cdot \frac{3}{4} \cdot \left[ \frac{7}{6} - \frac{1}{3} \cdot \left( \frac{1}{2} + 2 \right) \right]^2 &= \frac{3}{10} - \frac{6}{4} \cdot \left[ \frac{7}{6} - \frac{1}{3} \cdot \left( \frac{5}{2} \right) \right]^2 = \frac{3}{10} - \frac{6}{4} \cdot \left( \frac{7}{6} - \frac{5}{6} \right)^2 = \\ &= \frac{3}{10} - \frac{6}{4} \cdot \left( \frac{2}{6} \right)^2 = \frac{3}{10} - \frac{6}{4} \cdot \frac{4}{36} = \frac{3}{10} - \frac{6}{36} = \frac{3}{10} - \frac{1}{6} = \frac{18}{60} - \frac{10}{60} = \frac{8}{60} = \frac{2}{15} \end{aligned}$$

28.- Calcula: Puedes comprobar los resultados con tu calculadora, con *Qalculate!*, con *WIRIS* ...

$$\text{a) } \frac{\frac{1}{2} + \frac{1}{5}}{\frac{3}{4} - \frac{1}{2}}$$

$$\frac{\frac{1}{2} + \frac{1}{5}}{\frac{3}{4} - \frac{1}{2}} = \frac{\frac{5}{10} + \frac{2}{10}}{\frac{3}{4} - \frac{2}{4}} = \frac{\frac{5+2}{10}}{\frac{3-2}{4}} = \frac{\frac{7}{10}}{\frac{1}{4}} = \frac{7 \cdot 4}{10 \cdot 1} = \frac{28}{10} = \frac{14}{5}$$

$$\text{b) } \frac{\frac{1}{2} \cdot \left( \frac{5}{6} - \frac{1}{2} \right)}{\left( \frac{1}{4} + \frac{1}{3} \right) \cdot \frac{1}{2}} = \frac{\frac{1}{2} \cdot \left( \frac{5}{6} - \frac{1}{2} \right)}{\left( \frac{1}{4} + \frac{1}{3} \right) \cdot \frac{1}{2}} = \frac{\frac{5}{6} - \frac{1}{2}}{\frac{1}{4} + \frac{1}{3}} = \frac{\frac{5}{6} - \frac{3}{6}}{\frac{3}{12} + \frac{4}{12}} = \frac{\frac{5-3}{6}}{\frac{3+4}{12}} = \frac{\frac{2}{6}}{\frac{7}{12}} = \frac{2 \cdot 12}{6 \cdot 7} = \frac{24}{42} = \frac{4}{7}$$

$$\text{c) } \frac{\frac{9}{8} - \frac{5}{4} \cdot \frac{1}{3}}{\frac{2}{3} \cdot \frac{4}{5} - \frac{1}{4}}$$

$$\frac{\frac{9}{8} - \frac{5}{4} \cdot \frac{1}{3}}{\frac{2}{3} \cdot \frac{4}{5} - \frac{1}{4}} = \frac{\frac{9}{8} - \frac{5}{12}}{\frac{10}{12} - \frac{1}{4}} = \frac{\frac{27}{24} - \frac{10}{24}}{\frac{10}{12} - \frac{3}{12}} = \frac{\frac{17}{24}}{\frac{7}{12}} = \frac{17 \cdot 12}{24 \cdot 7} = \frac{204}{168} = \frac{17}{14}$$

$$\text{d) } \frac{\frac{3}{4} + \frac{1}{4} \cdot \left( \frac{5}{3} - 1 \cdot \frac{6}{5} \right)}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}}$$

$$\begin{aligned} \frac{\frac{3}{4} + \frac{1}{4} \cdot \left( \frac{5}{3} - 1 \cdot \frac{6}{5} \right)}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}} &= \frac{\frac{3}{4} + \frac{1}{4} \cdot \left( \frac{5}{3} - \frac{6}{5} \right)}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}} = \frac{\frac{3}{4} + \frac{1}{4} \cdot \left( \frac{10}{6} - \frac{5}{5} \right)}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}} = \frac{\frac{3}{4} + \frac{1}{4} \cdot \frac{5}{6}}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}} = \frac{\frac{3}{4} + \frac{5}{24}}{\frac{3}{8} + \frac{4}{3} - \frac{7}{12}} = \\ &= \frac{\frac{18}{24} + \frac{5}{24}}{\frac{9}{24} + \frac{32}{24} - \frac{14}{24}} = \frac{\frac{18+5}{24}}{\frac{9+32-14}{24}} = \frac{\frac{18+5}{24}}{\frac{41-14}{24}} = \frac{\frac{23}{24}}{\frac{27}{24}} = \frac{23 \cdot 24}{24 \cdot 27} = \frac{23}{27} \end{aligned}$$

### Resolución de problemas

29.- Roque calcula que su gato pasa durmiendo, aproximadamente, 10 horas diarias.

a) ¿Qué fracción del día pasa durmiendo?

$$\frac{10}{24} = \frac{5}{12} \text{ del día}$$

b) En un año completo, ¿a cuántos días equivale el tiempo que pasa durmiendo? *Savia*

$$\frac{5}{12} \cdot 365 \text{ días} = \frac{1.825}{12} \text{ días} = 152,08 \hat{=} \text{días} = \mathbf{152 \text{ días}}$$

30.- Pilar tiene un huerto con varios cultivos:

- Dedicar  $\frac{1}{12}$  a su plantación de tomates.
- $\frac{5}{24}$  a patatas.
- $\frac{3}{16}$  a lechugas.
- $\frac{1}{6}$  a remolachas.

¿A qué cultivo dedica más y menos superficie de terreno?

$$\frac{1}{12}, \frac{5}{24}, \frac{3}{16}, \frac{1}{6} \rightarrow \frac{4}{48}, \frac{10}{48}, \frac{9}{48}, \frac{8}{48} \Rightarrow \frac{10}{48} > \frac{9}{48} > \frac{8}{48} > \frac{4}{48} \Rightarrow \frac{5}{24} > \frac{3}{16} > \frac{1}{6} > \frac{1}{12} \Rightarrow$$
$$\Rightarrow \text{patatas} > \text{lechugas} > \text{remolachas} > \text{tomates}$$

31.- Una familia gasta  $\frac{1}{4}$  de sus ingresos en el alquiler de su vivienda,  $\frac{1}{8}$  en alimentación y  $\frac{1}{12}$  en las facturas del gas y teléfono. ¿Qué fracción de los ingresos tiene para otros gastos?

Ingresos  $\rightarrow 1$

Alquiler  $\rightarrow -\frac{1}{4}$

Alimentación  $\rightarrow -\frac{1}{8}$

Gas y teléfono  $\rightarrow -\frac{1}{12}$

$$1 - \frac{1}{4} - \frac{1}{8} - \frac{1}{12} = \frac{24}{24} - \frac{6}{24} - \frac{3}{24} - \frac{2}{24} = \frac{24-6-3-2}{24} =$$
$$= \frac{13}{24} \text{ para otros gastos}$$

32.- Un agricultor ha plantado árboles en una zona de su finca. La tercera parte son almendros y  $\frac{2}{9}$  son nogales. Entre almendros y nogales suman 10 árboles. ¿Cuántos árboles ha plantado en total?

Almendros  $\rightarrow \frac{1}{3}$

Nogales  $\rightarrow \frac{2}{9}$

Almendros + Nogales  $\rightarrow 10$

Total  $\rightarrow x$

$$\left(\frac{1}{3} + \frac{2}{9}\right) \text{ de } x = 10 \Rightarrow \left(\frac{3}{9} + \frac{2}{9}\right) \text{ de } x = 10 \Rightarrow \frac{5}{9} \text{ de } x = 10 \Rightarrow$$
$$\Rightarrow \frac{5x}{9} = 10 \Rightarrow 5x = 10 \cdot 9 \Rightarrow 5x = 90 \Rightarrow x = \frac{90}{5} = \mathbf{18 \text{ árboles}}$$

- 33.- En un autobús están ocupadas los  $\frac{4}{5}$  de las plazas. De ellas, la sexta parte la ocupan niños, y la mitad, adolescentes. Expresa con una fracción las plazas que ocupa el resto de los viajeros.

$$\text{Ocupadas} \rightarrow \frac{4}{5}$$

$$\text{Niños} \rightarrow \frac{1}{6} \text{ de } \frac{4}{5} = \frac{1 \cdot 4}{6 \cdot 5} = \frac{4}{30} = \frac{2}{15}$$

$$\text{Adolescentes} \rightarrow \frac{1}{2} \text{ de } \frac{4}{5} = \frac{1 \cdot 4}{2 \cdot 5} = \frac{4}{10} = \frac{2}{5}$$

$$\begin{aligned} \text{Resto} &\rightarrow \frac{4}{5} - \frac{2}{15} - \frac{2}{5} = \frac{12}{15} - \frac{2}{15} - \frac{6}{15} = \\ &= \frac{12-2-6}{15} = \frac{12-8}{15} = \frac{4}{15} \end{aligned}$$

- 34.- Los vecinos de una comunidad se reúnen para decidir si ponen ascensor. Hay  $\frac{3}{4}$  de ellos que están a favor, y la mitad de los restantes en contra. Hay 8 vecinos que se abstienen. ¿Cuántos vecinos hay en la comunidad?

$$\text{Vecinos} \rightarrow x$$

$$\text{A favor} \rightarrow \frac{3}{4} \text{ de } x = \frac{3x}{4}$$

$$\text{Restantes} \rightarrow \frac{1}{4} \text{ de } x = \frac{x}{4}$$

$$\text{En contra} \rightarrow \frac{1}{2} \text{ de } \frac{x}{4} = \frac{x}{8}$$

$$\text{Se abstienen} \rightarrow 8$$

$$\begin{aligned} \frac{3x}{4} + \frac{x}{8} + 8 &= x \\ \frac{8 \cdot 3x}{4} + \frac{8x}{8} + 8 \cdot 8 &= 8x \\ 6x + x + 64 &= 8x \\ 7x + 64 &= 8x \\ 7x - 8x &= -64 \\ -x &= -64 \\ x &= \frac{-64}{-1} \\ x &= \mathbf{64 \text{ vecinos}} \end{aligned}$$

- 35.- La mitad de los habitantes de Villaquebrado han nacido en el pueblo. Cuatro quinceavos de los habitantes vienen de Ciudad Racional y el resto son de Cocientópolis. ¿Qué fracción de los habitantes vienen de esta última ciudad?

$$\text{Habitantes de Villaquebrados} \rightarrow 1$$

$$\text{Nacidos en Villaquebrados} \rightarrow \frac{1}{2}$$

$$\text{Nacidos en Ciudad Racional} \rightarrow \frac{4}{15}$$

$$\text{Nacidos en Cocientópolis} \rightarrow x$$

$$x = 1 - \frac{1}{2} - \frac{4}{15} = \frac{1}{2} - \frac{4}{15} = \frac{15}{30} - \frac{8}{30} = \frac{15-8}{30} = \frac{7}{30}$$

36.- Elvira estuvo varios días de vacaciones. La tercera parte los pasó en Francia, la cuarta parte en Suiza y los 10 días restantes en Italia. ¿Cuántos días duraron sus vacaciones?

*Días de vacaciones  $\rightarrow x$*

*Días en Francia  $\rightarrow \frac{1}{3}$  de  $x = \frac{x}{3}$*

*Días en Suiza  $\rightarrow \frac{1}{4}$  de  $x = \frac{x}{4}$*

*Días en Italia  $\rightarrow 10$*

$$\frac{x}{3} + \frac{x}{4} + 10 = x$$

$$\frac{12x}{3} + \frac{12x}{4} + 12 \cdot 10 = 12x$$

$$4x + 3x + 120 = 12x$$

$$7x + 120 = 12x$$

$$7x - 12x = -120$$

$$-5x = -120$$

$$x = \frac{-120}{-5}$$

$$x = \mathbf{24 \text{ días}}$$

37.- En una comunidad de vecinos:

- La quinta parte son de Córdoba.
- Los  $\frac{5}{8}$  de los que quedan son de Santander.
- El resto son de Murcia.

a) ¿Qué fracción representa la gente de Murcia?

*Comunidad  $\rightarrow 1$*

*Córdoba  $\rightarrow \frac{1}{5}$*

*Santander  $\rightarrow \frac{5}{8}$  de  $\left(1 - \frac{1}{5}\right) = \frac{5}{8} \cdot \frac{4}{5} = \frac{20}{40} = \frac{1}{2}$*

$$1 - \frac{1}{5} - \frac{1}{2} = \frac{4}{5} - \frac{1}{2} = \frac{8}{10} - \frac{5}{10} = \frac{3}{10} \text{ de Murcia}$$

b) Si hay 32 personas de Santander, ¿cuántos vecinos tiene la comunidad?

*Comunidad  $\rightarrow x$  vecinos*

*Santander  $\rightarrow \frac{1}{2}$  de  $x$  vecinos = 32 vecinos*

$$\frac{1}{2} \text{ de } x = 32 \Rightarrow x = 32 \cdot 2 = \mathbf{64 \text{ vecinos}}$$

38.- Mario paga una compra a plazos:

- La primera semana paga la mitad de su deuda.
- La segunda semana paga la mitad de la mitad.
- La tercera semana paga la mitad de la mitad de la mitad.
- La cuarta semana paga los 20 € que faltan.

Calcula cuánto tendrá que pagar cada semana.

*Compra* → 1

*Primera semana* →  $\frac{1}{2}$

*Segunda semana* →  $\frac{1}{2}$  de  $\frac{1}{2} = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

*Tercera semana* →  $\frac{1}{2}$  de  $\frac{1}{2}$  de  $\frac{1}{2} = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$

*Cuarta semana* →  $1 - \frac{1}{2} - \frac{1}{4} - \frac{1}{8} = \frac{1}{2} - \frac{1}{4} - \frac{1}{8} = \frac{4}{8} - \frac{2}{8} - \frac{1}{8} = \frac{4-2-1}{8} = \frac{4-3}{8} = \frac{1}{8}$

*Compra* →  $x$  €

*Cuarta semana* →  $\frac{1}{8}$  de  $x$  € = 20 €

$$\frac{1}{8} \text{ de } x = 20 \Rightarrow x = 20 \cdot 8 = 160 \text{ €}$$

$$\frac{1}{2} \text{ de } 160 \text{ €} = \frac{160}{2} \text{ €} = \mathbf{80 \text{ € la 1ª semana}}$$

$$\frac{1}{4} \text{ de } 160 \text{ €} = \frac{160}{4} \text{ €} = \mathbf{40 \text{ € la 2ª semana}}$$

$$\frac{1}{8} \text{ de } 160 \text{ €} = \frac{160}{8} \text{ €} = \mathbf{20 \text{ € la 3ª semana}}$$

$$\frac{1}{8} \text{ de } 160 \text{ €} = \mathbf{20 \text{ € la 4ª semana}}$$

39.- Un camión cisterna transporta agua a zonas de África con sequía.

En la última entrega no observaron que había un agujero por el que se perdió una docena parte de la capacidad. De lo que quedó, dejaron  $\frac{2}{5}$  en la primera aldea, y en la segunda  $\frac{3}{4}$  de lo que quedaba. En las dos últimas se repartió, lo que quedaba, a partes iguales. ¿Qué fracción de la capacidad total dejaron en las últimas aldeas?

*Total de agua* → 1

*Pérdida* →  $\frac{1}{12}$

*1ª aldea* →  $\frac{2}{5}$  de  $\left(1 - \frac{1}{12}\right) = \frac{2}{5}$  de  $\frac{11}{12} = \frac{2 \cdot 11}{5 \cdot 12} = \frac{22}{60} = \frac{11}{30}$

*2ª aldea* →  $\frac{3}{4}$  de  $\left(1 - \frac{1}{12} - \frac{11}{30}\right) = \frac{3}{4}$  de  $\left(\frac{11}{12} - \frac{11}{30}\right) = \frac{3}{4}$  de  $\left(\frac{55}{60} - \frac{22}{60}\right) = \frac{3}{4}$  de  $\frac{33}{60} = \frac{99}{240} = \frac{33}{80}$

*Quedaba* →  $1 - \frac{1}{12} - \frac{11}{30} - \frac{33}{80} = \frac{11}{12} - \frac{11}{30} - \frac{33}{80} = \frac{220}{240} - \frac{88}{240} - \frac{99}{240} = \frac{220-88-99}{240} = \frac{33}{240}$

$$\frac{33}{240} : 2 = \frac{33}{480} = \frac{11}{160} \text{ en cada una de las dos últimas aldeas}$$

40.- Tres quintos de los asistentes a una fiesta son niños, y el resto, adultos.

Más adelante solo siguen llegando niños, hasta que finalmente el número de niños es el doble que el que había al principio. Si al principio había 15 niños, ¿qué fracción de las personas que hay al final de la fiesta serán niños?

*Al principio*

$$\frac{3}{5} \text{ de } x = 15 \Rightarrow \frac{3}{5} \cdot x = 15 \Rightarrow x = \frac{15 \cdot 5}{3} = \frac{75}{3} = 25 \text{ asistentes}$$

*Niños*  $\rightarrow 15$

*Adultos*  $\rightarrow 25 - 15 = 10$

*Al final*

$10 \text{ adultos} + 2 \cdot 15 \text{ niños} = 10 \text{ adultos} + 30 \text{ niños} = 40 \text{ asistentes}$

$$\frac{30 \text{ niños}}{40 \text{ asistentes}} = \frac{3}{4} \text{ de niños}$$



Ejercicios resueltos: *Fracciones* by [Damián Gómez Sarmiento](#) is licensed under a [Creative Commons Reconocimiento-CompartirIgual 4.0 Internacional License](#)