

1. Expressa els enunciats amb una fracció.

a) 7 de cada 10 estudiants aproven al juny.  $\rightarrow \frac{7}{10}$  *aproven*

b) De 25 enquestats, 21 hi van respondre afirmativament.  $\rightarrow \frac{21}{25}$  *afirmativament*

c) D'una producció de 10 000 vehicles, les tres quartes parts s'exporten a l'estranger.  
 $\rightarrow \frac{3}{4}$  *de 100 000 s'exporten*

d) El meu avi reparteix 12 caramels entre 4 néts.  $\rightarrow \frac{12}{4}$

2. Classifica les fraccions de l'exercici anterior en pròpies i impròpies.

a)  $\frac{7}{10}$  *pròpia*

b)  $\frac{21}{25}$  *pròpia*

c)  $\frac{3}{4}$  *pròpia*

d)  $\frac{12}{4}$  *impròpia*

3. Carolina llig un llibre de 416 pàgines. Fins ara ha llegit tres huitenes parts del llibre..

*Dades:*

*nombre de pàgines: 416*

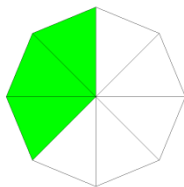
*pàgines llegides:  $\frac{3}{8}$*

a) Quantes pàgines ha llegit?

$$\frac{3}{8} \text{ de } 416 = \frac{3 \cdot 416}{8} = 156$$

*Solució: ha llegit 156 pàgines.*

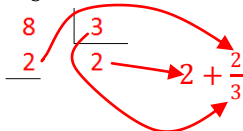
b) Quina fracció del total li queda per llegir?



*li queden  $\frac{5}{8}$*

4. Escriu cada fracció com a suma d'un nombre natural i una fracció pròpia.

a)  $\frac{8}{3}$



b)  $\frac{20}{17}$

$$\begin{array}{r} 20 \\ 17 \\ \hline 3 \end{array} \quad \begin{array}{r} 17 \\ 17 \\ \hline 0 \end{array} \quad 1 + \frac{3}{17}$$

c)  $\frac{16}{9}$

$$\begin{array}{r} 16 \\ \underline{9} \end{array} \quad \begin{array}{r} 9 \\ \underline{1} \end{array} \quad 1 + \frac{7}{9}$$

d)  $\frac{17}{4}$

$$\begin{array}{r} 17 \\ \underline{4} \end{array} \quad \begin{array}{r} 4 \\ \underline{4} \end{array} \quad 4 + \frac{1}{4}$$

e)  $\frac{31}{8}$

$$\begin{array}{r} 31 \\ \underline{8} \end{array} \quad \begin{array}{r} 8 \\ \underline{3} \end{array} \quad 3 + \frac{7}{8}$$

f)  $\frac{27}{5}$

$$\begin{array}{r} 27 \\ \underline{5} \end{array} \quad \begin{array}{r} 5 \\ \underline{5} \end{array} \quad 5 + \frac{2}{5}$$

5. Completa.

a)  $\frac{7}{4} = 1 + \frac{3}{4}$

$$\frac{7}{4} = 1 + \frac{3}{4} \rightarrow 4 \cdot 1 + 3 = 7$$

b)  $\frac{19}{6} = \blacksquare + \frac{1}{6}$

$$\frac{19}{6} = 3 + \frac{1}{6} \rightarrow 3 \cdot 6 + 1 = 19$$

c)  $\frac{14}{5} = 2 + \blacksquare$

$$\frac{14}{5} = 2 + \frac{4}{5} \rightarrow 2 \cdot 5 + 4 = 14$$

d)  $\frac{\blacksquare}{3} = 3 + \frac{1}{3}$

$$\frac{10}{3} = 3 + \frac{1}{3} \rightarrow 2 \cdot 3 + 1 = 10$$

e)  $\frac{25}{7} = 3 + \frac{\blacksquare}{7}$

$$\frac{25}{7} = 3 + \frac{4}{7} \rightarrow 3 \cdot 7 + 4 = 25$$

$$f) \frac{25}{8} = 3 + \frac{1}{8}$$

$$\frac{25}{8} = 3 + \frac{1}{8} \rightarrow 3 \cdot 8 + 1 = 25$$

6. Troba l'error i corregeix-lo.

$$a) \frac{28}{6} = 4 + \frac{1}{6}$$

$$\begin{array}{r} 28 \\ \underline{4} \end{array} \quad \begin{array}{r} 6 \\ 4 \end{array} \rightarrow 4 + \frac{4}{6}$$

$$b) \frac{42}{15} = 3 + \frac{3}{15}$$

$$\begin{array}{r} 42 \\ \underline{1} \end{array} \quad \begin{array}{r} 15 \\ 2 \end{array} \rightarrow 2 + \frac{12}{15}$$

$$c) \frac{36}{8} = 4 + \frac{3}{4}$$

$$\begin{array}{r} 36 \\ \underline{4} \end{array} \quad \begin{array}{r} 8 \\ 4 \end{array} \rightarrow 4 + \frac{4}{8}$$

$$d) \frac{87}{10} = 8 + \frac{7}{5}$$

$$\begin{array}{r} 87 \\ \underline{7} \end{array} \quad \begin{array}{r} 10 \\ 8 \end{array} \rightarrow 8 + \frac{7}{10}$$

7. Troba la fracció impròpia en cada cas.

$$a) 7 + \frac{1}{2} = \frac{2 \cdot 7 + 1}{2} = \frac{15}{2}$$

$$b) 9 + \frac{3}{4} = \frac{9 \cdot 4 + 3}{4} = \frac{39}{4}$$

$$c) 5 + \frac{2}{3} = \frac{3 \cdot 5 + 2}{3} = \frac{17}{3}$$

$$d) 8 + \frac{4}{5} = \frac{8 \cdot 5 + 4}{5} = \frac{44}{5}$$

$$e) 2 + \frac{1}{6} = \frac{2 \cdot 6 + 1}{6} = \frac{13}{6}$$

$$d) 4 + \frac{3}{7} = \frac{4 \cdot 7 + 3}{7} = \frac{31}{7}$$

8. Indica entre quins dos nombres naturals es troben les fraccions impròpies següents.

a)  $\frac{7}{2} \rightarrow$  entre 3 i 4  

$$\begin{array}{r} 7 \quad | \quad 2 \\ \underline{1} \quad 3 \end{array}$$

b)  $\frac{9}{5} \rightarrow$  entre 1 i 2  

$$\begin{array}{r} 9 \quad | \quad 5 \\ \underline{4} \quad 1 \end{array}$$

c)  $\frac{15}{7} \rightarrow$  entre 2 i 3  

$$\begin{array}{r} 15 \quad | \quad 7 \\ \underline{1} \quad 5 \quad 2 \end{array}$$

d)  $\frac{23}{4} \rightarrow$  entre 5 i 6  

$$\begin{array}{r} 23 \quad | \quad 4 \\ \underline{2} \quad 3 \quad 5 \end{array}$$

e)  $\frac{21}{5} \rightarrow$  entre 4 i 5  

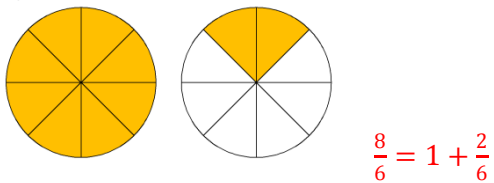
$$\begin{array}{r} 21 \quad | \quad 5 \\ \underline{2} \quad 1 \quad 4 \end{array}$$

f)  $\frac{29}{6} \rightarrow$  entre 4 i 5  

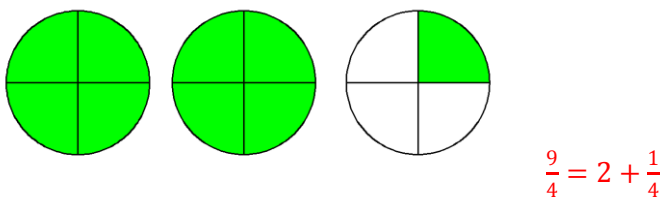
$$\begin{array}{r} 29 \quad | \quad 6 \\ \underline{2} \quad 9 \quad 4 \end{array}$$

9. Indica les fraccions impròpies que representen aquestes figures i expressa-les com la suma d'un nombre més una fracció.

a)



b)



10. Indica fraccions són equivalents.

a)  $\frac{1}{3}$  i  $\frac{2}{5}$

$$\left. \begin{array}{l} 1 \cdot 5 = 5 \\ 3 \cdot 2 = 6 \end{array} \right\} 1 \cdot 5 \neq 2 \cdot 3 \text{ no són equivalents}$$

b)  $\frac{3}{5}$  i  $\frac{6}{10}$

$$\left. \begin{array}{l} 3 \cdot 10 = 30 \\ 5 \cdot 6 = 30 \end{array} \right\} 3 \cdot 10 = 5 \cdot 6 \text{ són equivalents}$$

c)  $\frac{3}{15}$  i  $\frac{3}{9}$

$$\left. \begin{array}{l} 3 \cdot 9 = 27 \\ 15 \cdot 3 = 45 \end{array} \right\} 3 \cdot 9 \neq 15 \cdot 3 \text{ no són equivalents}$$

11. Calcula el valor de  $x$  perquè siguin equivalents.

a)  $\frac{x}{3} = \frac{8}{6}$

$$3 \cdot 8 = x \cdot 6 \rightarrow 24 = 4 \cdot 6 \rightarrow 24 = 24 \rightarrow \frac{4}{3} = \frac{8}{6}$$

b)  $\frac{4}{x} = \frac{6}{3}$

$$3 \cdot 4 = x \cdot 6 \rightarrow 12 = 2 \cdot 6 \rightarrow 12 = 12 \rightarrow \frac{4}{2} = \frac{6}{3}$$

c)  $\frac{8}{4} = \frac{x}{2}$

$$8 \cdot 2 = 4 \cdot x \rightarrow 16 = 4 \cdot 4 \rightarrow 16 = 16 \rightarrow \frac{8}{4} = \frac{4}{2}$$

12. Escriu tres fraccions equivalents.

a) Un quart d'hora

$$\frac{15}{60} = \frac{5}{20} = \frac{1}{4}$$

b) Una setmana per mes

$$\frac{7}{30} = \frac{14}{60} = \frac{21}{90}$$

13. Si el numerador d'un fracció es divideix per un nombre i el denominador es multiplica pel mateix nombre, són equivalents les fraccions? Pos'an un exemple.

No

$$\frac{4}{5} \rightarrow \frac{4:2}{5 \cdot 2} = \frac{2}{10} \rightarrow 4 \cdot 10 \neq 2 \cdot 5 \rightarrow 40 \neq 10$$

14. Redueix a denominador comú les fraccions següents.

a)  $\frac{7}{2}$  i  $\frac{3}{4}$

$$2 = 2$$

$$4 = 2^2$$

$$mcm(2, 4) = 2^2 = 4$$

$$\frac{4}{2} = 2 \rightarrow \frac{7}{2} = \frac{7 \cdot 2}{2 \cdot 2} = \frac{14}{4}; \quad \frac{4:2 \cdot 7}{4} = \frac{14}{4}$$

$$\frac{4}{4} = 1 \rightarrow \frac{3}{4} = \frac{3 \cdot 1}{4 \cdot 1} = \frac{3}{4}; \quad \frac{4:4 \cdot 3}{4} = \frac{3}{4}$$

b)  $\frac{5}{8}$  i  $\frac{9}{6}$

$$6 = 2 \cdot 3$$

$$8 = 2^3$$

$$mcm(8, 6) = 2^3 \cdot 3 = 24$$

$$\frac{24}{8} = 3 \rightarrow \frac{5}{8} = \frac{5 \cdot 3}{8 \cdot 3} = \frac{15}{24}; \quad \frac{24:8 \cdot 9}{24} = \frac{15}{24}$$

$$\frac{24}{6} = 4 \rightarrow \frac{9}{6} = \frac{9 \cdot 4}{6 \cdot 4} = \frac{36}{24}; \quad \frac{24:6 \cdot 9}{24} = \frac{36}{24}$$

c)  $\frac{12}{96}$  i  $\frac{9}{144}$

$$\begin{array}{r|l} 9 & 2 \\ 4 & 8 & 2 \\ 2 & 4 & 2 \\ 1 & 2 & 2 \\ & 6 & 2 \\ & 3 & 3 \\ & 1 & \end{array}$$

$$\begin{array}{r|l} 1 & 4 & 4 & 2 \\ & 7 & 2 & 2 \\ & 3 & 6 & 2 \\ & 1 & 8 & 2 \\ & & 9 & 3 \\ & & 3 & 3 \\ & & 1 & \end{array}$$

$$96 = 2^5 \cdot 3$$

$$144 = 2^2 \cdot 3^2$$

$$mcm(96, 144) = 2^5 \cdot 3^2 = 288$$

$$\frac{288}{96} = 3 \rightarrow \frac{12}{96} = \frac{12 \cdot 3}{96 \cdot 3} = \frac{36}{288}; \quad \frac{288:96 \cdot 9}{288} = \frac{36}{288}$$

$$\frac{288}{144} = 2 \rightarrow \frac{9}{144} = \frac{9 \cdot 2}{144 \cdot 2} = \frac{18}{288}; \quad \frac{288:144 \cdot 9}{288} = \frac{18}{288}$$

15. Redueix aquests parells de fraccions a denominador comú.

a)  $\frac{7}{2}$  i  $\frac{5}{8}$

$$2 = 2$$

$$8 = 2^3$$

$$mcm(2, 8) = 2^3 = 8$$

$$\frac{8:2 \cdot 7}{8} = \frac{28}{8}$$

$$\frac{8:8 \cdot 5}{8} = \frac{5}{8}$$

b)  $\frac{3}{4} i \frac{9}{6}$

$$4 = 2^2$$

$$6 = 2 \cdot 3$$

$$mcm(4,6) = 2^2 \cdot 3 = 12$$

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

$$\frac{12:6 \cdot 9}{12} = \frac{18}{12}$$

c)  $\frac{3}{5} i \frac{2}{15}$

$$5 = 5$$

$$15 = 3 \cdot 5$$

$$mcm(5,15) = 3 \cdot 5 = 15$$

$$\frac{15:5 \cdot 3}{15} = \frac{9}{15}$$

$$\frac{15:15 \cdot 2}{15} = \frac{2}{15}$$

d)  $\frac{9}{20} i \frac{7}{30}$

$$20 = 2^2 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$mcm(20,30) = 2^2 \cdot 3 \cdot 5 = 60$$

$$\frac{60:20 \cdot 9}{60} = \frac{27}{60}$$

$$\frac{60:30 \cdot 7}{60} = \frac{14}{60}$$

e)  $\frac{3}{4} i \frac{9}{20}$

$$4 = 2^2$$

$$20 = 2^2 \cdot 5$$

$$mcm(4,20) = 2^2 \cdot 5 = 20$$

$$\frac{20:4 \cdot 3}{20} = \frac{15}{20}$$

$$\frac{20:20 \cdot 9}{20} = \frac{9}{20}$$

$$f) \frac{9}{6} i \frac{7}{30}$$

$$6 = 2 \cdot 3$$

$$30 = 2 \cdot 3 \cdot 5$$

$$mcm(6, 30) = 2 \cdot 3 \cdot 5 = 30$$

$$\frac{30:6 \cdot 9}{30} = \frac{45}{30}$$

$$\frac{30:30 \cdot 7}{30} = \frac{7}{30}$$

$$g) \frac{5}{8} i \frac{1}{10}$$

$$8 = 2^3$$

$$10 = 2 \cdot 5$$

$$mcm(8, 10) = 2^3 \cdot 5 = 40$$

$$\frac{40:8 \cdot 5}{40} = \frac{25}{40}$$

$$\frac{40:10 \cdot 1}{40} = \frac{4}{40}$$

$$h) \frac{9}{6} i \frac{2}{15}$$

$$6 = 2 \cdot 3$$

$$15 = 3 \cdot 5$$

$$mcm(6, 15) = 2 \cdot 3 \cdot 5 = 30$$

$$\frac{30:6 \cdot 9}{30} = \frac{45}{30}$$

$$\frac{30:15 \cdot 2}{30} = \frac{4}{30}$$

$$i) \frac{3}{4} i \frac{1}{10}$$

$$4 = 2^2$$

$$10 = 2 \cdot 5$$

$$mcm(4, 10) = 2^2 \cdot 5 = 20$$

$$\frac{20:4 \cdot 3}{20} = \frac{15}{20}$$

$$\frac{20:10 \cdot 1}{20} = \frac{2}{20}$$



$$j) \frac{2}{7} i \frac{3}{5}$$

$$7 = 7$$

$$5 = 5$$

$$mcm(7, 5) = 5 \cdot 7 = 35$$

$$\frac{35:7 \cdot 2}{35} = \frac{10}{35}$$

$$\frac{35:5 \cdot 3}{35} = \frac{21}{35}$$

**16.** Redueix a denominador comú aquests conjunts de fraccions.

$$a) \frac{7}{2}, \frac{3}{4} i \frac{9}{6}$$

$$2 = 2$$

$$4 = 2^2$$

$$6 = 2 \cdot 3$$

$$mcm(2, 4, 6) = 2^2 \cdot 3 = 12$$

$$\frac{12:2 \cdot 7}{12} = \frac{42}{12}$$

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

$$\frac{12:6 \cdot 9}{12} = \frac{18}{12}$$

$$b) \frac{3}{4}, \frac{5}{8} i \frac{9}{6}$$

$$4 = 2^2$$

$$8 = 2^3$$

$$6 = 2 \cdot 3$$

$$mcm(4, 8, 6) = 2^3 \cdot 3 = 24$$

$$\frac{24:4 \cdot 3}{24} = \frac{18}{24}$$

$$\frac{24:8 \cdot 5}{24} = \frac{15}{24}$$

$$\frac{24:6 \cdot 9}{24} = \frac{36}{24}$$

$$c) \frac{3}{4}, \frac{9}{20} i \frac{2}{15}$$

$$4 = 2^2$$

$$20 = 2^2 \cdot 5$$

$$15 = 3 \cdot 5$$

$$mcm(4, 20, 15) = 2^2 \cdot 3 \cdot 5 = 60$$

$$\frac{60:4 \cdot 3}{60} = \frac{45}{60}$$

$$\frac{60:20 \cdot 9}{60} = \frac{27}{60}$$

$$\frac{60:15 \cdot 2}{60} = \frac{8}{60}$$

$$d) \frac{5}{8}, \frac{2}{15} i \frac{7}{30}$$

$$8 = 2^3$$

$$30 = 2 \cdot 3 \cdot 5$$

$$15 = 3 \cdot 5$$

$$mcm(8, 15, 30) = 2^3 \cdot 3 \cdot 5 = 120$$

$$\frac{120:8 \cdot 5}{120} = \frac{75}{120}$$

$$\frac{120:15 \cdot 2}{120} = \frac{16}{120}$$

$$\frac{120:30 \cdot 7}{120} = \frac{28}{120}$$

17. Redueix a denominador comú les fraccions següents.

$$a) \frac{3}{5}, \frac{2}{15} i \frac{7}{30}$$

$$5 = 5$$

$$15 = 3 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$mcm(5, 15, 30) = 2 \cdot 3 \cdot 5 = 30$$

$$\frac{30:5 \cdot 3}{30} = \frac{18}{30}$$

$$\frac{30:15 \cdot 2}{30} = \frac{4}{30}$$

$$\frac{30:30 \cdot 7}{30} = \frac{7}{30}$$

$$b) \frac{7}{2}, \frac{5}{8} i \frac{9}{20}$$

$$2 = 2$$

$$8 = 2^3$$

$$20 = 2^2 \cdot 5$$

$$mcm(2, 8, 20) = 2^3 \cdot 5 = 40$$

$$\frac{40:2 \cdot 7}{40} = \frac{140}{40}$$

$$\frac{40:8 \cdot 5}{40} = \frac{25}{40}$$

$$\frac{40:20 \cdot 9}{40} = \frac{18}{40}$$

$$c) \frac{2}{15}, \frac{1}{10} i \frac{7}{30}$$

$$15 = 3 \cdot 5$$

$$10 = 2 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$mcm(15, 10, 30) = 2 \cdot 3 \cdot 5 = 30$$

$$\frac{30:15 \cdot 2}{30} = \frac{4}{30}$$

$$\frac{30:10 \cdot 1}{30} = \frac{3}{30}$$

$$\frac{30:30 \cdot 7}{30} = \frac{7}{30}$$

$$d) \frac{7}{2}, \frac{9}{20} i \frac{7}{30}$$

$$2 = 2$$

$$20 = 2^2 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$mcm(2, 20, 30) = 2^2 \cdot 3 \cdot 5 = 60$$

$$\frac{60:2 \cdot 7}{60} = \frac{210}{60}$$

$$\frac{60:20 \cdot 9}{60} = \frac{27}{60}$$

$$\frac{60:30 \cdot 7}{60} = \frac{14}{60}$$

18. Redueix a denominador comú les fraccions següents.

$$a) \frac{1}{7}, \frac{1}{11} i \frac{1}{9}$$

$$7 = 7$$

$$11 = 11$$

$$9 = 3^2$$

$$mcm(7, 11, 9) = 3^2 \cdot 7 \cdot 11 = 693$$

$$\frac{693:7 \cdot 1}{693} = \frac{99}{693}$$

$$\frac{693:11 \cdot 1}{693} = \frac{63}{693}$$

$$\frac{693:9 \cdot 1}{693} = \frac{77}{693}$$

$$b) \frac{1}{13}, \frac{1}{8} i \frac{1}{15}$$

$$13 = 13$$

$$8 = 2^3$$

$$15 = 3 \cdot 5$$

$$mcm(13, 8, 15) = 2^3 \cdot 3 \cdot 5 \cdot 13 = 1560$$

$$\frac{1560:13 \cdot 1}{1560} = \frac{120}{1560}$$

$$\frac{1560:8 \cdot 1}{1560} = \frac{195}{1560}$$

$$\frac{1560:15 \cdot 1}{1560} = \frac{104}{1560}$$

19. Redueix a denominador comú aquests grups de fraccions.

$$a) \frac{3}{5}, \frac{2}{9}, \frac{1}{4} i \frac{7}{3}$$

$$5 = 5$$

$$9 = 3^2$$

$$4 = 2^2$$

$$3 = 3$$

$$mcm(5, 9, 4, 3) = 2^2 \cdot 3^2 \cdot 5 = 180$$

$$\frac{180:5 \cdot 3}{180} = \frac{108}{180}$$

$$\frac{180:9 \cdot 2}{180} = \frac{40}{180}$$

$$\frac{180:4 \cdot 1}{180} = \frac{45}{180}$$

$$\frac{180:3 \cdot 7}{180} = \frac{420}{180}$$

$$b) \frac{7}{3}, \frac{1}{6}, \frac{9}{2} i \frac{5}{12}$$

$$3 = 3$$

$$6 = 2 \cdot 3$$

$$2 = 2$$

$$12 = 2^2 \cdot 3$$

$$mcm(3, 6, 2, 12) = 2^2 \cdot 3 = 12$$

$$\frac{7}{3} = \frac{12:3 \cdot 7}{12} = \frac{28}{12}$$

$$\frac{1}{6} = \frac{12:6 \cdot 1}{12} = \frac{2}{12}$$

$$\frac{9}{2} = \frac{12:2 \cdot 9}{12} = \frac{54}{12}$$

$$\frac{5}{12} = \frac{12:12 \cdot 5}{12} = \frac{5}{12}$$

$$c) \frac{4}{5}, \frac{3}{10}, \frac{2}{15}, \frac{9}{20} i \frac{1}{4}$$

$$5 = 5$$

$$10 = 2 \cdot 5$$

$$15 = 3 \cdot 5$$

$$20 = 2^2 \cdot 5$$

$$4 = 2^2$$

$$mcm(5, 10, 15, 20, 4) = 2^2 \cdot 3 \cdot 5 = 60$$

$$\frac{4}{5} = \frac{60:5 \cdot 4}{60} = \frac{48}{60}$$

$$\frac{3}{10} = \frac{60:10 \cdot 3}{60} = \frac{18}{60}$$

$$\frac{2}{15} = \frac{60:15 \cdot 2}{60} = \frac{8}{60}$$

$$\frac{9}{20} = \frac{60:20 \cdot 9}{60} = \frac{27}{60}$$

$$\frac{1}{4} = \frac{60:4 \cdot 1}{60} = \frac{15}{60}$$

**20.** Redueix a denominador comú aquests grups de fraccions.

$$\frac{3}{5}, \frac{9}{20}, \frac{2}{15}, \frac{1}{10}, \frac{7}{30}, \frac{12}{450} i \frac{32}{600}$$

$$5 = 5$$

$$10 = 2 \cdot 5$$

$$15 = 3 \cdot 5$$

$$20 = 2^2 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$450 = 2 \cdot 3^2 \cdot 5^2$$

$$600 = 2^3 \cdot 3 \cdot 5^2$$

$$mcm(5, 10, 15, 20, 30, 450, 600) = 2^3 \cdot 3^2 \cdot 5^2 = 1800$$

$$\frac{3}{5} = \frac{1800:5 \cdot 3}{1800} = \frac{1080}{1800}$$

$$\frac{9}{20} = \frac{1800:20 \cdot 9}{1800} = \frac{810}{1800}$$

$$\frac{2}{15} = \frac{1800:15 \cdot 2}{1800} = \frac{240}{1800}$$

$$\frac{1}{10} = \frac{1800:10 \cdot 1}{1800} = \frac{180}{1800}$$

$$\frac{7}{30} = \frac{1800:30 \cdot 7}{1800} = \frac{420}{1800}$$

$$\frac{12}{450} = \frac{1800:450 \cdot 12}{1800} = \frac{486}{1800}$$

$$\frac{32}{600} = \frac{1800:600 \cdot 32}{1800} = \frac{96}{1800}$$

21. Completa amb els termes que falten perquè siguin fraccions equivalents.

$$a) \frac{4}{9} = \frac{8}{\blacksquare} = \frac{40}{\blacksquare} \rightarrow \frac{4}{9} = \frac{8}{18} = \frac{40}{90}$$

$$b) \frac{90}{120} = \frac{15}{\blacksquare} = \frac{\blacksquare}{12} \rightarrow \frac{90}{120} = \frac{15}{20} = \frac{9}{12}$$

22. Calcula quines de les fraccions següents són equivalents per amplificació a  $\frac{5}{7}$ .

$$\frac{45}{63} \quad \frac{25}{30} \quad \frac{30}{45} \quad \frac{40}{56} \quad \frac{100}{140}$$

$$\frac{5}{7} = \frac{5 \cdot 9}{7 \cdot 9} = \frac{45}{63} \text{ SI}$$

$$\frac{5}{7} = \frac{5 \cdot 5}{7 \cdot 5} = \frac{25}{35} \text{ NO}$$

$$\frac{5}{7} = \frac{5 \cdot 6}{7 \cdot 6} = \frac{30}{42} \text{ NO}$$

$$\frac{5}{7} = \frac{5 \cdot 8}{7 \cdot 8} = \frac{40}{56} \text{ SI}$$

$$\frac{5}{7} = \frac{5 \cdot 20}{7 \cdot 20} = \frac{100}{140} \text{ SI}$$

23. Determina quines d'aquestes fraccions són equivalents per simplificació a  $\frac{300}{500}$ .

$$\frac{15}{20} \quad \frac{12}{20} \quad \frac{3}{5} \quad \frac{9}{15} \quad \frac{27}{45}$$

$$\frac{300:20}{500:20} = \frac{15}{25} \neq \frac{15}{20} \text{ NO}$$

$$\frac{300:25}{500:25} = \frac{12}{20} = \frac{15}{20} \text{ SI}$$

$$\frac{\frac{300}{\frac{100}{3}}}{\frac{500}{\frac{100}{3}}} = \frac{\frac{900}{100}}{\frac{1500}{100}} = \frac{9}{15} \text{ SI}$$

$$\frac{300:100}{500:100} = \frac{3}{5} = \frac{3}{5} \text{ SI}$$

$$\frac{\frac{300}{\frac{100}{9}}}{\frac{500}{\frac{100}{9}}} = \frac{\frac{2700}{100}}{\frac{4500}{100}} = \frac{27}{45} \text{ SI}$$

24. Les fraccions  $\frac{250}{375}$  i  $\frac{14}{21}$  són equivalents. Indica com se n'ha simplificat o amplificat una per obtenir l'altra.

$$250 = 2 \cdot 5^3$$

$$375 = 3 \cdot 5^3$$

$$MCD(250, 375) = 5^3 = 125$$

$$\frac{250:125}{375:125} = \frac{2}{3}$$

$$\frac{2 \cdot 7}{3 \cdot 7} = \frac{14}{21}$$

$$\frac{250 \cdot \frac{7}{125}}{375 \cdot \frac{7}{125}} = \frac{14}{21}$$

25. Troba la fracció irreductible de les fraccions següents.

a)  $\frac{25}{45}$

$$25 = 5^2$$

$$45 = 3^2 \cdot 5$$

$$mcd(25, 45) = 5$$

$$\frac{25:5}{45:5} = \frac{5}{9}$$

b)  $\frac{14}{21}$

$$\begin{aligned}
 14 &= 2 \cdot 7 \\
 21 &= 3 \cdot 7 \\
 \text{mcd}(14, 21) &= 7 \\
 \frac{14:7}{21:7} &= \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } \frac{3}{15} \\
 3 &= 3 \\
 15 &= 3 \cdot 5 \\
 \text{mcd}(3, 15) &= 3 \\
 \frac{3:3}{15:3} &= \frac{1}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } \frac{9}{45} \\
 9 &= 3^2 \\
 45 &= 3^2 \cdot 5 \\
 \text{mcd}(9, 45) &= 3^2 = 9 \\
 \frac{9:9}{45:9} &= \frac{1}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{e) } \frac{28}{48} \\
 28 &= 2^2 \cdot 7 \\
 48 &= 2^4 \cdot 3 \\
 \text{mcd}(28, 48) &= 2^2 = 4 \\
 \frac{28:4}{48:4} &= \frac{7}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{f) } \frac{50}{15} \\
 50 &= 2 \cdot 5^2 \\
 15 &= 3 \cdot 5 \\
 \text{mcd}(50, 15) &= 5 \\
 \frac{50:5}{15:5} &= \frac{10}{3}
 \end{aligned}$$

**26.** Determina la fracció irreductible de cadascuna de les fraccions següents.

$$\begin{aligned}
 \text{a) } \frac{40}{26} \\
 40 &= 2^3 \cdot 5 \\
 26 &= 2 \cdot 13 \\
 \text{mcd}(40, 26) &= 2 \\
 \frac{40:2}{26:2} &= \frac{20}{13}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } \frac{12}{45} \\
 12 &= 2^2 \cdot 3
 \end{aligned}$$



$$45 = 3^2 \cdot 5$$

$$\text{mcd}(12, 45) = 3$$

$$\frac{12:3}{45:3} = \frac{4}{15}$$

c)  $\frac{12}{27}$

$$12 = 2^2 \cdot 3$$

$$27 = 3^3$$

$$\text{mcd}(12, 27) = 3$$

$$\frac{12:3}{27:3} = \frac{4}{9}$$

d)  $\frac{20}{18}$

$$20 = 2^2 \cdot 5$$

$$18 = 2 \cdot 3^2$$

$$\text{mcd}(20, 18) = 2$$

$$\frac{20:2}{18:2} = \frac{10}{9}$$

e)  $\frac{60}{55}$

$$60 = 2^2 \cdot 3 \cdot 5$$

$$55 = 5 \cdot 11$$

$$\text{mcd}(60, 55) = 5$$

$$\frac{60:5}{55:5} = \frac{12}{11}$$

f)  $\frac{65}{45}$

$$65 = 5 \cdot 13$$

$$45 = 3^2 \cdot 5$$

$$\text{mcd}(65, 45) = 5$$

$$\frac{65:5}{45:5} = \frac{13}{9}$$

**31.** Simplifica fins arribar a la fracció irreductible indicant tots els passos.

a)  $\frac{120}{140}$

1 2 0	2	1 4 0	2
6 0	2	7 0	2
3 0	2	3 5	5
1 5	3	7	7
5	5	1	
1			

$$120 = 2^3 \cdot 5$$

$$140 = 2^2 \cdot 5 \cdot 7$$

$$\text{mcd}(120, 140) = 2^2 \cdot 5 = 20$$

$$\frac{120:20}{140:20} = \frac{6}{7}$$

b)  $\frac{210}{275}$

2	1	0	2	2	7	5	5
1	0	5	3	5	5	5	5
3	5	5	1	1	1	1	1
7	7		1				
1							

$210 = 2 \cdot 3 \cdot 5 \cdot 7$   
 $275 = 5^2 \cdot 11$   
 $mcd(210, 275) = 5$   
 $\frac{210:5}{275:5} = \frac{42}{55}$

c)  $\frac{708}{57}$

7	0	8	2	5	7	3
3	5	4	2	1	9	1
1	7	7	3	1		
5	9	5	9			
1						

$708 = 2^2 \cdot 3 \cdot 59$   
 $57 = 3 \cdot 19$   
 $mcd(708, 57) = 3$   
 $\frac{708:3}{57:3} = \frac{236}{19}$

d)  $\frac{144}{198}$

1	4	4	2	1	9	8	2
7	2	2	9	9	3		3
3	6	2	3	3	3		3
1	8	2	1	1	1	1	1
9	3		1	1			
3	3						
1							

$144 = 2^4 \cdot 3^2$   
 $198 = 2 \cdot 3^2 \cdot 11$   
 $mcd(144, 198) = 2 \cdot 3^2 = 18$   
 $\frac{144:18}{198:18} = \frac{8}{11}$

32. Simplifica aquestes fraccions fins trobar la fracció irreductible.

a)  $\frac{2^6}{2^2 \cdot 3} = \frac{\frac{2^6}{2^2}}{\frac{2^2 \cdot 3}{2^2}} = \frac{2^4}{3} = \frac{16}{3}$

b)  $\frac{3^2}{2^3 \cdot 3} = \frac{\frac{3^2}{3}}{\frac{2^3 \cdot 3}{3}} = \frac{3}{2^3} = \frac{3}{8}$

$$c) \frac{3^4}{5^3 \cdot 3^3} = \frac{\frac{3^4}{3^3}}{\frac{5^3 \cdot 3^3}{3^3}} = \frac{3}{5^3} = \frac{3}{125}$$

$$d) \frac{5^4}{5^2 \cdot 3^2} = \frac{\frac{5^4}{5^2}}{\frac{5^2 \cdot 3^2}{5^2}} = \frac{5^2}{3^2} = \frac{25}{9}$$

$$e) \frac{5 \cdot 2^3}{5^3 \cdot 2} = \frac{\frac{5 \cdot 2^3}{2 \cdot 5}}{\frac{5^3 \cdot 2}{2 \cdot 5}} = \frac{2^2}{5^2} = \frac{4}{25}$$

$$f) \frac{3^5 \cdot 2^3}{5^3 \cdot 3^2} = \frac{\frac{3^5 \cdot 2^3}{3^2}}{\frac{5^3 \cdot 3^2}{3^2}} = \frac{3^3 \cdot 2^3}{5^3} = \frac{216}{125}$$

$$g) \frac{3^4 \cdot 5^3}{5^5 \cdot 3^4} = \frac{\frac{3^4 \cdot 5^3}{5^3 \cdot 3^4}}{\frac{5^5 \cdot 3^4}{5^3 \cdot 3^4}} = \frac{1}{5^2} = \frac{1}{25}$$

$$h) \frac{3 \cdot 5^4 \cdot 2^2}{2 \cdot 5^2 \cdot 3^3} = \frac{\frac{3 \cdot 5^4 \cdot 2^2}{2 \cdot 3 \cdot 5^2}}{\frac{2 \cdot 5^2 \cdot 3^3}{2 \cdot 3 \cdot 5^2}} = \frac{2 \cdot 5^2}{3^2} = \frac{50}{9}$$

$$i) \frac{7 \cdot 2^2}{5 \cdot 3^2} = \frac{\frac{7 \cdot 2^2}{5 \cdot 3^2}}{\frac{1}{1}} = \frac{28}{45}$$

33. Ordena de menor a major.

$$a) \frac{5}{2}, \frac{5}{6}, \frac{5}{4}, \frac{5}{3}$$

$$\frac{5}{6} > \frac{5}{4} > \frac{5}{3} > \frac{5}{2}$$

$$b) \frac{2}{15}, \frac{7}{15}, \frac{8}{15}, \frac{4}{15}$$

$$\frac{2}{15} > \frac{4}{15} > \frac{7}{15} > \frac{8}{15}$$

34. Completa amb <, > o =.

$$a) \frac{3}{2} \blacksquare \frac{4}{9}$$

$$2 = 2$$

$$9 = 3^2$$

$$mcm(2, 9) = 2 \cdot 3^2 = 18$$

$$\frac{18:2 \cdot 3}{18} = \frac{27}{18}$$

$$\frac{18:2 \cdot 4}{18} = \frac{8}{18}$$

$$\frac{3}{2} > \frac{4}{9}$$

b)  $\frac{2}{3} \blacksquare \frac{9}{4}$

$$3 = 3$$

$$2 = 2^2$$

$$mcm(3, 4) = 2^2 \cdot 3 = 12$$

$$\frac{12:3 \cdot 2}{12} = \frac{8}{12}$$

$$\frac{12:4 \cdot 9}{12} = \frac{27}{12}$$

$$\frac{2}{3} < \frac{9}{4}$$

c)  $\frac{3}{4} \blacksquare \frac{6}{9}$

$$4 = 2^2$$

$$9 = 3^2$$

$$mcm(4, 9) = 2^2 \cdot 3^2 = 36$$

$$\frac{36:4 \cdot 3}{36} = \frac{27}{36}$$

$$\frac{36:9 \cdot 6}{36} = \frac{24}{36}$$

$$\frac{3}{4} > \frac{6}{9}$$

35. Escriu en el quadern una fracció compresa entre aquestes fraccions.

a)  $\frac{3}{5} < \blacksquare < \frac{4}{5}$

$$\frac{3 \cdot 2}{5 \cdot 2} < \blacksquare < \frac{4 \cdot 2}{5 \cdot 2}$$

$$\frac{6}{10} < \blacksquare < \frac{8}{10}$$

$$\frac{6}{10} < \frac{7}{10} < \frac{8}{10}$$

$$b) \frac{2}{7} < \blacksquare < \frac{3}{7}$$

$$\frac{2 \cdot 2}{7 \cdot 2} < \blacksquare < \frac{3 \cdot 2}{7 \cdot 2}$$

$$\frac{4}{14} < \blacksquare < \frac{6}{14}$$

$$\frac{4}{14} < \frac{5}{14} < \frac{6}{14}$$

$$c) \frac{5}{9} < \blacksquare < \frac{2}{3}$$

$$\frac{5}{9} < \blacksquare < \frac{2 \cdot 3}{3 \cdot 3}$$

$$\frac{5}{9} < \blacksquare < \frac{6}{9}$$

$$\frac{5 \cdot 2}{9 \cdot 2} < \blacksquare < \frac{6 \cdot 2}{9 \cdot 2}$$

$$\frac{10}{18} < \blacksquare < \frac{12}{18}$$

$$\frac{10}{18} < \frac{11}{18} < \frac{12}{18}$$

$$d) \frac{5}{8} < \blacksquare < \frac{3}{4}$$

$$\frac{5}{8} < \blacksquare < \frac{2 \cdot 2}{4 \cdot 2}$$

$$\frac{5}{8} < \blacksquare < \frac{4}{8}$$

$$\frac{5 \cdot 2}{8 \cdot 2} < \blacksquare < \frac{4 \cdot 2}{8 \cdot 2}$$

$$\frac{10}{16} < \blacksquare < \frac{8}{16}$$

$$\frac{10}{16} < \frac{9}{16} < \frac{8}{16}$$

36. Fes les operacions següents entre fraccions.

$$a) \frac{3}{5} + \frac{6}{5} = \frac{6+3}{5} = \frac{9}{5}$$

$$b) \frac{1}{3} + \frac{4}{3} = \frac{1+4}{3} = \frac{5}{3}$$

$$c) \frac{3}{2} + \frac{9}{4} + \frac{7}{2} = \frac{3 \cdot 2}{2 \cdot 2} + \frac{9}{4} + \frac{7 \cdot 2}{2 \cdot 2} = \frac{6}{4} + \frac{9}{4} + \frac{14}{4} = \frac{29}{4}$$

$$d) \frac{9}{8} + \frac{5}{8} - \frac{3}{4} = \frac{9}{8} + \frac{5}{8} - \frac{3 \cdot 2}{4 \cdot 2} = \frac{9}{8} + \frac{5}{8} - \frac{6}{8} = \frac{8}{8} = 1$$

$$e) \frac{9}{7} - \frac{1}{7} - \frac{3}{7} = \frac{9-1-3}{7} = \frac{5}{7}$$

$$a) \frac{10}{6} + \frac{19}{3} - \frac{8}{3} = \frac{10}{6} + \frac{19 \cdot 2}{3 \cdot 2} - \frac{8 \cdot 2}{3 \cdot 2} = \frac{10}{6} + \frac{38}{6} - \frac{16}{6} = \frac{32}{6} = \frac{16}{3}$$

37. Resol les operacions següents.

$$a) \frac{8}{5} + \frac{13}{15} - 3 = \frac{8 \cdot 3}{5 \cdot 3} + \frac{13}{15} - \frac{3 \cdot 15}{15} = \frac{24}{15} + \frac{13}{15} - \frac{45}{15} = \frac{24+13-45}{15} = -\frac{8}{15}$$

$$b) \frac{4}{9} - 5 + \frac{12}{5} - \frac{3}{10} = \frac{90:9 \cdot 4}{90} - \frac{90:1 \cdot 5}{90} + \frac{90:5 \cdot 12}{90} - \frac{90:10 \cdot 3}{90} = \frac{40}{90} - \frac{450}{90} + \frac{216}{90} - \frac{27}{90}$$

$$= \frac{40 - 450 + 216 - 27}{90} = -\frac{221}{90}$$

$$9 = 3^2$$

$$5 = 5$$

$$10 = 2 \cdot 5$$

$$mcm(5, 9, 10) = 2 \cdot 3^2 \cdot 5 = 90$$