

MATEMÁTICAS -- 2º ESO -- IES LOS PACOS

Name: 31/10/2014

1. Say if the following fractions are equivalent:

$$\text{a) } \frac{2}{3} \text{ and } \frac{6}{9} \quad \text{b) } \frac{6}{12} \text{ and } \frac{9}{18} \quad \text{c) } \frac{2}{4} \text{ and } \frac{5}{6} \quad \text{d) } \frac{16}{35} \text{ and } \frac{5}{30}$$

2. Write an equivalent fraction to:

- a) $\frac{5}{3}$ that has as numerator 30.
 b) $\frac{1}{3}$ whose denominator is a number between 6 and 18.

3. Reduce these fractions:

$$\begin{array}{lll} \text{a) } \frac{60}{90} & \text{c) } -\frac{125}{175} & \text{e) } \frac{120}{162} \\ \text{b) } \frac{72}{48} & \text{d) } -\frac{242}{110} & \text{f) } -\frac{36}{42} \end{array}$$

4. Order the fractions in each case in ascending order.

$$\text{a) } \frac{2}{5}, \frac{3}{10}, \frac{5}{20}, \frac{3}{15} \quad \text{b) } \frac{3}{5}, \frac{4}{7}, \frac{12}{70} \quad \text{c) } -\frac{2}{4}, -\frac{3}{9}, -\frac{3}{12}, -\frac{7}{8}$$

5. Calculate these additions and subtractions with fractions. Reduce if it is possible:

$$\begin{array}{lll} \text{a) } \frac{2}{3} - \frac{1}{6} + 3 & \text{b) } \frac{1}{3} + \frac{3}{6} - \frac{2}{5} + \frac{4}{6} - 2 & \text{c) } \left(\frac{4}{6} + \frac{3}{6}\right) - \frac{1}{3} \\ \text{d) } \left(\frac{1}{3} + \frac{3}{6}\right) - \left(\frac{2}{5} + \frac{3}{10}\right) & \text{e) } \left(\frac{3}{6} + \frac{4}{6}\right) - \left(\frac{2}{5} + \frac{1}{3}\right) + \frac{2}{10} & \text{f) } \left(1 - \frac{3}{5}\right) - \left(\frac{2}{10} - 4\right) \end{array}$$

6. Calculate these multiplications and divisions with fractions. Reduce if it is possible:

$$\begin{array}{lll} \text{a) } \frac{2}{3} \cdot \frac{2}{7} & \text{b) } \frac{3}{5} \cdot \frac{1}{5} \cdot \frac{2}{3} & \text{c) } \frac{13}{5} : \frac{5}{10} \\ \text{d) } \frac{2}{9} \cdot 3 \cdot \frac{5}{4} & \text{e) } \frac{3}{5} \cdot \frac{5}{3} : \frac{2}{3} & \text{f) } \left(\frac{2}{12} \cdot \frac{6}{4}\right) : \left(\frac{3}{4} : \frac{3}{2}\right) \end{array}$$

7. Calculate using the order of operation. Simplify as much as possible.

$$\begin{array}{lll} \text{a) } 1 + \frac{3}{2} : \frac{3}{5} & \text{b) } \frac{7}{22} \cdot \frac{33}{9} + \frac{10}{11} & \text{c) } \frac{1}{3} + \frac{5}{6} - \frac{3}{5} \cdot \frac{3}{2} \\ \text{d) } \frac{3}{5} \cdot \left(\frac{2}{3} - \frac{2}{5}\right) & \text{e) } \frac{5}{14} : \left(\frac{1}{6} + \frac{9}{14}\right) & \text{f) } \frac{3}{2} \cdot \left(\frac{1}{3} - \frac{1}{5}\right) : \frac{2}{6} \end{array}$$

8. Calculate using the order of operation. Simplify if it is possible.

$$\begin{array}{ll} \text{a) } \frac{4}{7} \cdot 2 - \frac{1}{4} \cdot \left(2 - \frac{1}{3}\right) & \text{b) } \left(\frac{1}{9} - \frac{7}{6}\right) \cdot \left(\frac{6}{5} - \frac{3}{10}\right) : \left(\frac{1}{2} + \frac{3}{4}\right) \\ \text{c) } 3 - \frac{5}{3} \cdot \left(\frac{7}{2} + 1\right) - \frac{1}{2} : 3 & \text{d) } \left(\frac{3}{5} - \frac{2}{3} : \frac{5}{4} + \frac{1}{10}\right) : \left(\frac{4}{3} \cdot 2 - 1\right) \end{array}$$

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

$$f) \frac{3}{4} \cdot \left(\frac{2}{5} - \frac{3}{15} \right) + 2 : \frac{4}{3} - \frac{1}{2}$$

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

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

9. Calculate these powers:

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

$$d) \left(\frac{1}{5} \right)^4$$

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

$$b) \left(\frac{3}{7} \right)^2$$

$$e) \left(-\frac{1}{3} \right)^3$$

$$h) \left(-\frac{7}{13} \right)^2$$

$$c) \left(\frac{7}{8} \right)^0$$

$$f) \left(\frac{2}{8} \right)^1$$

$$i) \left(\frac{2}{7} \right)^3$$

10. Using the power rules, express each expression with just one power:

$$a) \left(\left(\left(\frac{3}{4} \right)^2 \right)^2 \right)^2$$

$$d) \left(-\frac{3}{5} \right)^3 \cdot \left(\frac{5}{6} \right)^3$$

$$g) \left(-\frac{1}{2} \right)^4 : \left(-\frac{3}{4} \right)^4$$

$$b) \left(\frac{5}{3} \right)^2 \cdot \left(\frac{5}{3} \right)^3 \cdot \left(\frac{5}{3} \right)^4$$

$$e) \left(\frac{1}{2} \right)^5 \cdot \left(\frac{8}{5} \right)^5$$

$$h) \left(\frac{1}{2} \right)^3 : \left(\frac{1}{2} \right)^5$$

$$c) \left(\frac{2}{5} \right)^3 \cdot \left(\frac{2}{5} \right)^5 \cdot \left(\frac{2}{5} \right)^4$$

$$f) \left(-\frac{3}{7} \right)^8 : \left(-\frac{3}{7} \right)^3$$

$$g) \left(\frac{1}{3} \right)^3 : \left(\frac{4}{3} \right)^5$$

11. Reduce these expressions and calculate:

$$a) \left[\left(\frac{5}{2} \right) \cdot \left(\frac{5}{2} \right)^3 \cdot \left(\frac{5}{2} \right)^{-2} \right]^6 : \left(\frac{5}{2} \right)^{10}$$

$$b) \left[\left(-\frac{2}{3} \right)^2 \cdot \left(-\frac{2}{3} \right)^3 \right]^4 : \left[\left(-\frac{2}{3} \right)^6 \right]^3$$

$$c) \frac{4^0}{2^2 \cdot 3^2}$$

$$d) \frac{2^2 \cdot 2^0}{4}$$

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

$$f) \frac{(7^2 \cdot 3^4)^2 \cdot 7^2 \cdot 3}{3^{11} \cdot 7^5}$$

12. Knowing that $\left(\frac{a}{b} \right)^{-n} = \left(\frac{b}{a} \right)^n$, calculate:

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

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

$$c) \left(-\frac{3}{5} \right)^{-3}$$

$$d) \left(-\frac{7}{2} \right)^{-4}$$

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

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

$$g) \left(-\frac{8}{5} \right)^{-3}$$

$$h) \left(-\frac{1}{13} \right)^{-2}$$

$$i) (-3)^{-2}$$

$$j) 5^{-2}$$

$$k) (-3)^{-3}$$

$$l) 10^{-6}$$

13. Classify these decimal numbers and express them as a fraction:

a) 0,13131313...	c) 12,52	e) $1,\widehat{12}\widehat{1}$
b) 5,23333333...	d) $1,04\overline{5}$	f) 0,0005
14. Indicar a que conjuntos numéricos (Naturales, Enteros, Racionales), pertenecen los siguientes números: -3 , $\frac{5}{3}$, 4 , 0.25 , $\frac{8}{2}$, $-\frac{2}{3}$, $\frac{12}{6}$, 12.33333333 .
15. Escribir un número que cumpla lo siguiente:
 - a) Que sea un número entero y no sea un número natural.
 - b) Que sea un número racional y no sea un número entero.
16. Andrea is 12 years old, which represent the $\frac{2}{7}$ of her father's age. What is his age?
17. De un depósito que contiene 100 litros de gasolina se sacan los $\frac{3}{5}$ del total y después, $\frac{1}{4}$ del total. ¿Qué fracción de combustible se ha sacado? ¿Cuántos litros quedan en el depósito?
18. How many liters of perfume do you need to fill 30 bottles of $\frac{2}{5}$ liters of size?
19. Un rollo de 30 m de cable eléctrico se ha cortado en trozos iguales de $\frac{3}{5}$ de metro cada uno. ¿Cuántos trozos se han obtenido?
20. To prepare a cake, you need: $\frac{1}{3}$ of a package of 750 grams of sugar, $\frac{3}{4}$ of a kg package of flour and $\frac{3}{5}$ of a bar of butter of 200 g. Find, in grams, the quantities that are needed to prepare the cake.
21. A box contains 60 chocolates. Eva ate $\frac{1}{5}$ of the chocolates and Ana $\frac{1}{2}$.
 - a) How many chocolates did Eva eat, and Ana?
 - b) What fraction of chocolates remain in the box?
22. Ana has walked 600 m on her way to school. This distance is $\frac{3}{4}$ of the total distance from her house to the school. What is the total distance from the house to the school?
23. A father has divided 1800€ among his sons. The elder received $\frac{4}{9}$ of that amount, the middle $\frac{1}{3}$ and lower the remainder. How much money did each son receive? What fraction of the money was the third amount?
24. Alicia had 300€ for shopping. Thursday she spent $\frac{2}{5}$ of that amount, and on Saturday she spent $\frac{3}{4}$ of what he had left. How much money is spent each day and how much is left at the end?
25. Un comerciante vendió las tres cuartas partes de un cargamento de naranjas a un frutero. Después vendió dos terceras partes del resto a un supermercado y aún le quedaron 50 kg de naranjas. ¿Cuál era el peso inicial del cargamento?

SOME SOLUTIONS

- 1) a) Yes b) Yes c) No d) No
- 2) –
- 3) a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $-\frac{5}{7}$ d) $-\frac{11}{5}$ e) $\frac{20}{27}$ f) $\frac{6}{7}$
- 4) a) $\frac{3}{15} < \frac{5}{20} < \frac{3}{10} < \frac{2}{5}$ b) $\frac{12}{70} < \frac{4}{7} < \frac{3}{5}$ c) $-\frac{7}{8} < -\frac{2}{4} < -\frac{3}{9} < -\frac{3}{12}$
- 5) a) $\frac{7}{2}$ b) $-\frac{9}{10}$ c) $\frac{5}{6}$ d) $\frac{2}{15}$ e) $\frac{19}{30}$ f) $\frac{21}{5}$
- 6) a) $\frac{4}{21}$ b) $\frac{2}{25}$ c) $\frac{26}{5}$ d) $\frac{5}{6}$ e) $\frac{3}{2}$ f) $\frac{1}{2}$
- 7) a) $\frac{7}{2}$ b) $\frac{137}{66}$ c) $\frac{4}{15}$ d) $\frac{4}{25}$ e) $\frac{15}{34}$ f) $\frac{3}{5}$
- 8) a) $\frac{61}{84}$ b) $-\frac{19}{25}$ c) $-\frac{14}{3}$ d) $\frac{1}{10}$ e) $\frac{13}{10}$ f) $\frac{23}{20}$ g) $\frac{9}{44}$ h) $-\frac{100}{39}$
- 9) –
- 10) –
- 11) a) $\frac{25}{4}$ b) $\frac{4}{9}$ c) $\frac{1}{36}$ d) 1 e) 32 f) $\frac{7}{9}$
- 12) a) $\frac{9}{4}$ b) $\frac{2}{5}$ c) $-\frac{125}{27}$ d) $\frac{16}{2401}$ e) 2 f) $\frac{256}{81}$ g) $-\frac{125}{512}$
h) 169 i) $\frac{1}{9}$ j) $\frac{1}{25}$ k) $-\frac{1}{27}$ l) $\frac{1}{1000000}$
- 13) a) $\frac{13}{99}$ b) $\frac{471}{90}$ c) $\frac{313}{25}$ d) $\frac{941}{900}$ e) $\frac{1120}{999}$ f) $\frac{1}{2000}$
- 14) –
- 15) –
- 16) 42 years old
- 17) $\frac{17}{20}$ es la fracción. Quedan 15 litros
- 18) 12 liters
- 19) 50 trozos
- 20) Sugar: 250 gr Flour: 750 gr Butter: 120 gr
- 21) Eva: 12 chocolates Ana: 30 chocolates Remain $\frac{3}{10}$
- 22) 800 m
- 23) 800 €, 600 € and 400 €. The third amount is $\frac{2}{9}$.
- 24) Thursday: 120 € Saturday: 135 € Remain: 45€
- 25) 600 kg