EXERCISES: RATIONAL NUMBER AND FRACTIONS

1) Analize the context and solve the following situations in which fractions are involved:
   a) Two thirds of a class are girls. If there are fourteen girls in the classroom, what is the total number of students?
   b) If George pedals at 8km per hour, what is the distance he would go across after 75 minutes?
   c) A field has 200 square meters. What is the measure of the 5/8 parts of the field?
   d) They want to distribute 2 pizzas between 5 children. How much pizza will every child receive?
2) What is the number whose 2/3 parts are equal to 16? Is there any number whose 3/4 parts are equal to 7?
3) Write 1/3 as a difference of two fractions in two different ways. Write it as a sum of three different positive fractions.
4) Explain, without doing arithmetical operations, which number between 15/14 and 16/15 is greater.
5) Find in each situation a rational number which is comprised between each two fractions below:
   a) 1/13 and 1/11 b) 4/9 and 5/9 c) 1/13 and 1/14 d) 7/13 and 22/7
6) If we add the same quantity to both terms of a fraction, will we obtain a fraction which is equivalent to the first one? And if we divide them by the same number?
7) In a meeting of 24 people, there are 2/3 of them which are adult people and 3/4 of the adults are men.
   a) How many adult people are there in the meeting?
   b) How many children are there in the meeting?
   c) Which fraction corresponds to the men with respect to the total of people?
8) 2/3 of the people of a festival are adult people and from them 3/5 are men. There are 20 children more than women. How many men, women and children are there in the festival?
9) There are 5/8 of girls in a choir. 12 boys more should be added to equalize both sex. What is the composition of the choir by sex?
10) A mineral sample contains 2/9 parts of iron and the rest is waste. What is the weight of the waist that should be removed from the mineral to obtain 100kg of iron?
11) Pepe goes over 3/7 of the road in the first hour; 1/4 of the road in the second one and the remaining part in the third hour. In which one of the three hours has Pepe walked faster?
12) A Wii model consumes 8/9 of its battery in 14 hours, and a PS3 consumes 5/6 of its battery in 12 hours and three quarters. Which one consumes less?
13) A person spends monthly the fifth part of his/her salary on food and the sixth part on the hire of his/her flat. After those payments he/she has 570 euros left. Which is his/her monthly salary?

14) In a Company the taxes are the 1/3 of the expenses. In addition 5/8 of the taxes are national, 1/8 are autonomous and the remaining part are local taxes.
    a) Which fraction of the expenses is equivalent to the national taxes? And to the autonomous ones?
    b) If the local taxes are 90 euros, which are the other taxes?

15) The 5/8 of the population of a province is urban and the rest is rural. If 1/4 of the urban and 1/3 of the rural is less than 18 years old, which fraction of the population of the province is less than 18 years old?

16) In a family the father earns 3/5 of the family income and the mother earns the remaining part. The mother pays 1/3 of her income as indirect taxes in the tax return, whereas the father pays 1/6 of his income in the tax return. The family pays also 1/6 of the total income in autonomous taxes and they estimate that approximately 1/5 of that income is paid in indirect taxes (tobacco, gasoline, luxury items, etc.). What is the proportion of the total income that the family pays in taxes?

17) In the June call 3 of each 5 registered students of mathematics are examined, and for every 5 students who pass the exam there are two who fail it. Which fraction of registered students passes the exam in June?

18) John takes the half of a rope; Mary takes the half of the remaining part and, finally, Carmen takes 2/5 parts of the remaining part. There are left over 30 cm of rope at the end. What was the length of the rope?

19) A family spends 2/5 of its budget in its home and 1/3 in food. Once they cover those expenses, they have 600 euros left over. What is the monthly family income? Solve it graphically and numerically.

20) A delivery person leaves 2/5 of the boxes he/she carries in the truck in a supermarket, 4/9 of the remaining part in other supermarket, and he/she has finally 60 boxes left over. How many boxes did he/she have at the beginning of the delivery? Solve it numerically and graphically.

21) A gardener prunes 2/7 of his/her rose bushes on Monday, 3/5 of the remaining part on Tuesday and on Wednesday he/she finishes the job by pruning 20 rose bushes more. How many rose bushes does he/she have in the garden?

22) There is a post hammered in a riverbed. 1/7 of its length is hidden in the earth and 2/5 of its length is under the water level. It stands 5.4 meters above the river. What is the length of the post? Which fraction of the total length of the post is covered by water but it is not hidden in the earth?

23) All the members of a sports center play any of these two sports: football or basketball. 2/3 of the members play football and 1/5 of the football players are women. If there are the same number of women and men playing basketball, and there are 45 women in total, how many members does the sports center have?

24) An adventurous makes 2/5 of a trip in an all-terrain vehicle, 1/3 by horse and the remaining 80km by feet. What is the total length of the trip? Solve it graphically and numerically.

25) The regular step of a walker is 5/6 of meter long. If he/she walks two steps every three seconds, what is the distance he/she will go across in half an hour?

26) The pitch of a screw is 3/4 of a millimeter. How many laps do we have to give to the screw so that it hammers 1,8 cm?

27) How many glasses of one eighth of liter can be filled with a bottle of three quarters of liter?

28) We have done two kg and a quarter of jam and we have filled with it six equal jars. Which fraction of kg is contained in each jar?

29) If we stretch a spring it reaches 5/3 of its initial length. If it is 4.5cm when it is stretched, how long is the spring at rest?

30) From a washing powder container of 5kg we have consumed 2 kg and 3/4. Which fraction of the initial content is left over?

31) Olaya has eaten 3/5 of a cookies pack, her brother Xuan has eaten one fourth from the same pack, and Xicu, their dog, has eaten the 6 remaining cookies. How many cookies did the pack have? Solve it graphically and numerically.

32) In an exam a student answers correctly 16 questions from 20. If in other exam he/she obtains the same mark answering well to 24 questions, how many questions did the second exam have? What is the name of the relation of the fractions involved in the resolution of the problem?

33) James has given the half of his repeated stickers to his friend Nuria. From the remaining part, he gifts 1/3 to his friend Luis. Later he divides the remaining quantity of stickers in 5 equal parts, and he gives one of these parts to Nuria and other two parts to Luis. Finally, he realized that he has 8 repeated stickers.

a) From the repeated stickers that James had, which is the fraction of stickers that he gave to Luis?
b) How many repeated stickers did James have at the beginning?
c) How many more stickers did he give to Nuria than to Luis?
d) If one fourth of the total quantity of stickers he had was repeated and the whole collection consists of 200 stickers, how many stickers lack to complete the collection?

34) When the fuel gauge of a car indicates that the tank is filled until the fourth part of its capacity, we pour 21 euros more of gasoline so that the tank fills up until the 5/8 of its capacity. How much it costs to fill completely an empty tank?

35) Solve:

a) $\left\{\left(\frac{3}{5}+\frac{2}{3}\right)-\left(\frac{7}{10}-\frac{11}{15}+\frac{1}{2}\right)\right\}:\left(\frac{12}{5}-\frac{3}{2}+\frac{13}{10}\right)$ b) $\frac{1}{9}:\left(\frac{2}{5}-\frac{1}{6}\right)-\frac{4}{5}\times\left(\frac{2}{3}-\frac{1}{4}\right)$

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

36) Invent exercise wordings to be solved by means of the following operations:

a) $\frac{2}{3}\times\frac{1}{4}+\frac{3}{4}\times\frac{2}{5}$ b) $\frac{2}{5}+\left(\frac{3}{4}\times\frac{3}{5}\right)$

37) Write the fractions corresponding to the shading parts of the following figures: