Equation Problems (Solutions)

Number problems

1.- The sum of two numbers is 35. Their difference is 7. What are those numbers? **[video]**

2.- Three times one number plus half of another equals 10; and if we add 14 units to the first number, we get twice the second. Find these numbers.

3.- The difference of two numbers is 1/6, and the triple of the highest minus the double of the lowest is 1. Hállalos.

4.- Divide 180 into two addends such that the larger is twice the smaller.

5.- The sum of the digits of 2-digits number is 12. If the digits are permuted, the new number exceeds the previous one by 18 units. Find the number. **[video]**

6.- A number is made up of two digits whose sum is 9. The number we obtain by changing the order of their digits is equal to the original number plus 9 units. Find this number.

Money Problems

7.- Maria bought two shirts and a pair of pants for a total of 22 euros, and Pedro paid 39 euros for three shirts and two pairs of pants. What is the price of each shirt and pair of pants?

8.- For a coffee and two buns, I paid €2.70. My friend paid €4.60 for two coffees and three buns. Set up a system of equations to find the price of the coffee and each bun. **[video]**

9.- €280 has been paid for the purchase of 50 bottles of wine, some costing €5 and others €7 per bottle. How many bottles of each type have been purchased?

10.- A retailer has 50 pairs of sneakers for sale at €40 per pair. When he has sold a few, he reduces the price to €30 per pair, continuing the sale until they are sold out. The income was €1,620. How many pairs of each type of sneakers did he sell?

11.- With €10 from his mother, Juan bought 9 packages of whole milk and semi-skimmed milk for a total of €9.60. If the package of whole milk costs €1.15 and the semi-skimmed milk costs €0.90, how many packages of each type did he buy?

12.- Two workers work 8 hours a day at the same company. The first earns €5 more per day than the second. The second worked 30 days, while the first only 24. If the second earned €330 more than the first, calculate the daily salary of each worker.

13.- A merchant buys 50 kg of flour and 80 kg of rice, for which he has to pay €66.10; but he receives a 20% discount on the price of the flour and a 10% discount on the price of the rice. In this way He pays €56.24. What are the original prices for each item?

14.- For a calculator and a notebook, we would have paid €10.80 three days ago. The price of the calculator has increased by 8%, and the notebook has a 10% discount. With these changes, the two items cost us €11.34. How much did each item cost three days ago?

Coin Problems

15.- I have 13 coins between 2 and 5 cent coins. If I can exchange them all for a 50 cent coin, how many coins do I have of each class? **[video]**

16.- I have 30 coins. Some are five cents and others one cent. Can I have a total of 78 cents?

17.- In my pocket I have 50 bills, a mix of €5 and €20 bills. If I have €775 in total, how many bills of each type do I have?

18.- Juan says, "If I take 2 coins from you, I'll have as many as you," and Pepe replies, "Yes, but if I take 4 from you, then I'll have 4 times as many coins as you." How many coins do they each have? **[video]**

19.- Pepe says to Paco: “If you give me two coins, I will have the same as you; but if I take six coins from you, I will have twice as much as you.” How many coins does each one have?

20.- My 70-year-old grandfather wants to divide a certain amount of money among his grandchildren. If he gives us €300 each one has €600 left over and if he gives us €500 he is €1,000 short. How many grandchildren are we? How much did he want to distribute?

Age Problems

21.- Juan is 3 years older than his brother. In 3 years, the sum of their ages will be 29 years. How old are they?

22.- A father is 30 years older than his son. In 5 years, the father's age will be three times that of the son. How old is each one?

23.- 10 years ago, Tomás was twice as old as Patricia. In 5 years, Tomás will be 10 years older than Patricia. How old are they now? **[video]**

24.- Five years ago, a father was three times as old as his son, and in five years, he'll only be double that age. What are the ages of the father and son?

25.- A great-grandfather said to his great-granddaughter, "Today you're 1/5 of my age, and 7 years ago you were only 1/7 of my age." How old are the great-grandfather and great-granddaughter?

Geometric Problems

26.- In a rectangle, the base is 18 cm higher than the height and the perimeter is 76 cm. What are the dimensions of the rectangle?

27.- Determine the measurements of a rectangle with a perimeter of 1800 m and whose height is two-thirds of the base.

28.- The base of a rectangle is 2 cm larger than its height. If we increase the base and height by 3 cm (each), the perimeter of the new rectangle will be 4 cm smaller than 8 times the original base. Calculate the original dimensions. **[video]**

29.- The perimeter of an isosceles triangle is 19 cm. If one of the equal sides exceeds twice the length of the unequal side by 2 cm. Calculate its sides.

30.- Calculate the dimensions of this isosceles triangle knowing that:
* Its perimeter measures 48 cm
* The ratio between its sides is 5/2

31.- The base of a rectangle is 10 cm larger than its height. If the base increases by 20% and the height by 30%, the perimeter increases by 24%. Find the dimensions of the rectangle

Unclassified Problems

32.- My team has scored 5 more goals than the opposing team. If we score 2 more goals against them, we will have twice as many goals as them. What is the result now? **[video]**

33.- On a farm there are horses and swans. If the heads are counted, there are 10. If we count the legs, there are 36. How many animals of each kind are there? **[video]**

34.- A cruise ship has double and single rooms. In total it has 47 rooms and 79 beds. How many rooms do you have of each type?

35.- In a 30-question multiple-choice exam, 0.75 pts are obtained for each correct question, and 0.25 pts are subtracted for each failure. If a student who answered everything obtained 10.5 points. How many successes and failures did he have? **[video]**

36.- Find the amount of wine in two vessels, knowing that 2/5 of the first is equivalent to 2/3 of the second; and that half of the first contains 5 liters less than the second.

37.- A bus entrepreneur does not have space to park 8 of his coaches in his garage. After carrying out works to increase the parking seats by 50%, he observes that he has 8 free parking spaces left over. How many buses does he have? **[video]**

38.- In the last math test, the same number of boys and girls passed in my class. Two-thirds of the boys passed, and 75% of the girls passed. If there are 34 of us in total... How many boys and girls are there in my class? **[video]**

Mixing Problems

39.- We are going to mix wine of 35 €/liter with another wine of 60 €/liter with the idea of getting wine of a price of 50 €/liter. How much wine of each kind will we use to get 200 liters of that wine? **[video]**

40.- An orange mix priced at €2.50 per kilogram is to be mixed with oranges priced at €1.50 per kilogram, resulting in a mix of oranges to be sold at €1.90 per kilogram. How many kilograms of each type must be mixed to obtain 1,000 kg of the mix?

41.- If we want to obtain 10 kg of an alloy of metals by mixing a metal of €1,500/kg with another of €2,000/kg, how many kg of each one must be mixed to sell the alloy at €1,610/kg?

42.- By mixing 30 kg of paint with 50 kg of lower-quality paint, we obtain a mixture that is sold for €3.30/kg. If the price of the lower-quality paint is half that of the other, what is the price per kilo of each of the paints used?

43.- Juan mixes 5 kg of white chocolate whose price is 3 euros per kg., with 7 kg of dark chocolate, 4 euros per kg. What is the price of the resulting mixture?

44.- 8 litres of oil at €4 per litre are mixed with a cheaper one to obtain 20 litres at €2.5 per litre. What is the price of the cheapest oil?

45.- Eight liters of olive oil at €4 per liter are mixed with a cheaper oil to obtain 20 liters at €2.50 per liter. What is the price of the cheapest oil?

46.- A well-known rice brand creates a rice offer by mixing 1,500 kg of €2/kg rice with 2,500 kg of rice of another kind (lower-quality). If you get a mixture that comes out at €0.99/kg. What will the price of the second kind of rice be?

47.- Wines of €13 and €9 per litre are mixed. How much of the first one should be added to 80 liters of the second, to earn 10% by selling it for €10.50?

48.- There are 100 grams of salt in one kilogram of seawater. How much pure water and seawater are needed to ensure that 30 kg of the mixture contains only 2 kg of salt?

Vehicles Problems

49.- At 13:00 today, a train left Madrid for Seville at 110 km/h. At the same time, a train left Seville in the opposite direction at 200 km/h. If the distance between cities is 465 km... When and where do the two trains cross? **[video]**

50.- At the same time, Juan and Luis leave two villages that are 21 km apart, and go towards each other. Juan is going at 8 km/h, and Luis at 6 km/h. How long will it take to meet?

51.- A train leaves Madrid at 12:00 and travels at 200 km/h towards Barcelona. Half an hour later, a train leaves Barcelona in the opposite direction at 250 km/h. If the distance between cities is 550 km... When and where do the two trains cross? **[video]**

52.- A car leaves A at 8:00 a.m. at a speed of 90 km/h. Two hours later, a motorcycle leaves the same city, traveling along the same road, at 120 km/h. At what time does the motorcycle catch up with the car? **[video]**

53.- A car passes through a guard post at 90 km per hour. Five minutes after the car passes, a motorcycle comes out in pursuit at 120 km per hour. How long will it take for the motorcycle to catch up with the car?

54.- A cyclist starts from point A at a speed of 20 km/h. Another cyclist leaves the same point 15 minutes later. What should be the speed of the second cyclist if he intends to catch the first in an hour and a quarter?

55.- A person crosses a bridge in 7 minutes and a car in 1 minute. Knowing that the speed difference between the pedestrian and the car is 30 km/h, determine the length of the bridge and the speeds of the car and pedestrian.

56.- To get to work, an employee travels three-quarters of the total distance by bus, at an average speed of 20 km per hour, and the rest on foot, at an average speed of 5 km per hour. Knowing that it takes him 21 minutes to get to work, what total distance does he travel?

57.- Ana has two hours to go for a walk. She departs by tram at an average speed of 12 km per hour and returns on foot at an average speed of 4 km per hour. How far from the starting point should she leave the tram?

58.- A fox chased by a greyhound is 50 jumps ahead, and makes 4 jumps while the greyhound only jumps 3; but 2 jumps of the greyhound are equivalent to 3 of the fox. How many jumps will the greyhound make to catch up with the fox?

59.- A cyclist travels 120 km. On flat terrain, he travels at 30 km/h; on the way up, he travels at 20 km/h, and on the way down, he travels at 40 km/h. The journey takes 4 hours to return and 4 hours 30 minutes to return. Calculate the length of the flat terrain, the climbs, and the descents.

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Solutions:

1. 14 and 21
2. 2 and 8
3. 2/3 and 1/2
4. 120 and 60
5. 57
6. 45
7. T-shirt 5€ and pants 12€
8. Coffee 1,1€ and bum 0,8€
9. 15 of 7€ and 35 of 5€
10. 12 pairs at 40€ and 28 pairs at 30€
11. 6 whole packs and 3 semi-skimmed
12. The first worker earns 80€ and the second 75.
13. Flour cost €0.65/kg and rice €0.42/kg
14. Calculator 9€ and notebook 1,80 €
15. 8 of 5 cts. and 5 of 2 cts
16. Yes, 12 of 5 cts. and 18 of 1 ct
17. 15 of 5€ and 35 of 20€
18. Juan 8 and Pepe 12
19. Pepe 10 coins and Paco 14 coins
20. 8 grandsons and 3000 €
21. 10 and 13 years old
22. 40 and 10 years old
23. Tomas is 30 years old and Patricia is 20 years old
24. The father 35 and the son 15
25. 105 the great-grandfather and 21 the great-granddaughter.
26. 10x28 cm
27. 540 m base and 360 m high
28. Base 3 cm and height 1 cm
29. 3, 8 and 8 cm
30. Base 30 cm and height 20 cm
31. 20 and 8 cm
32. 7-2
33. 8 Horses and 2 Swans
34. 15 singles and 32 doubles.
35. 18 right answers and 12 wrong answers
36. 50 and 30 Litres
37. 40 Buses
38. 18 and 16
39. 120 liters of 60€/L and 80 liters of 35€/L
40. 400 of €2.50/kg and 600 of €1.50/kg
41. 7,8 kg of cheap and 2,2 kg of expensive
42. The best paint cost €4.80 and the lowest quality €2.40 per kilo.
43. 3,58 €
44. 1,5 € a litre
45. 2 € a litre
46. 0,38 € per-kilo
47. We will have to use 12.63 litres of wine of €13 per litre.
48. 10 kilos of pure water with 20 kg of seawater
49. At 14:30. 165 km apart from Madrid
50. 1,5 hours
51. At 1:30 p.m., 300 km from Madrid
52. At 16:00
53. The motorcycle catches up with the car in 15 minutes
54. 24 km/h
55. Vp=5 km/h, Vc=35 km/h and the bridge measures 7/12 km
56. The person travels 4 km to work
57. 6 km after taking the train
58. 300 jumps.
59. 60 km of plains, 40 km of climbs and 20 km of descents