



Name: _____ Date: _____

1. Calculate the unknown number in these proportions:

a. $\frac{2}{3} = \frac{5}{x}$

b. $\frac{5}{2.5} = \frac{x}{8}$

c. $\frac{x}{9} = \frac{12}{24}$

d. $\frac{2}{x} = \frac{5}{2}$

e. $\frac{4}{12} = \frac{12}{x}$

f. $\frac{18}{5} = \frac{7}{x}$

g. $\frac{4}{x} = \frac{x}{9}$

Directly Proportional Problems

We say that there is a **direct proportionality** between two magnitudes if an *increase* on one magnitude causes a proportional *increase* on the other and a *decrease* on the first quantity causes a proportional *decrease* on the second.

Note that a direct proportion is the same as proportions we have seen on the previous point. A direct proportion is also called simple proportion.

2. If two pencils cost \$1.50, how many pencils can you buy with \$9?
3. Jane ran 100 meters in 15 seconds. How long did she take to run 1 meter?
4. If $\frac{4}{7}$ of a tank can be filled in 2 minutes, how many minutes will it take to fill the whole tank?
5. Richard earns \$17.5 for working 7 hours. How much will he earn for working 9 hours.
6. For cooking a cake for 6 people the recipe says that we need 3 eggs, 150g of flour and 50 g of sugar. Calculate how much of each ingredient we need to cook a cake for 9 people.
7. Mara has exchanged \$325 and has received 250€ without any commission. How much in € will she receive for \$19.50? How much in \$ will she receive for 60€?
8. My car uses 16 litres of petrol to travel 250 km. a) How far can I travel with 55 litres? b) How much petrol would I need to travel 180 km?

Inversely Proportional Problems

We say that there is an **inverse proportionality** between two magnitudes if an *increase* in one magnitude causes a proportional *decrease* in the other and a *decrease* in the first magnitude causes a proportional *increase* in the other. That is if one magnitude is multiplied by 2, 3, ... this causes in the second a division by 2, 3, ... etc.

The most common example of inverse proportion problems would be “the more men on a job the less time taken for the job to complete”

9. If 18 men can do a job in 10 days, in how many days will 45 men do the same job?
10. It takes 12 hours for 3 bricklayers to build a wall. How long will it take for 5 bricklayers?
11. A company needs 33 workers to pack its production in 25 days, if the total production needs to be packed in 15 days. How many extra workers do they need?
12. It takes 4 men 6 hours to repair a road. How long will it take 12 men to do the job if they work at the same rate?
13. A truck that carries 3 tons need 15 trips to carry a certain amount of sand. How many trips are needed to carry the same amount of sand with another truck that carries 5 tons?
14. An automobile factory produces 8100 vehicles in 60 days. With the production rhythm unchanged. How many units will be made in one year?





Proportionality Problems

15. Arthur is typing a paper that is 390 words long. He can type 30 words in a minute. How long will it take for him to type the paper?
16. Two pumps take 5 days to empty a pool. How long will 5 pumps take to empty the same pool?
17. It takes 175 minutes to drive home at 80 km/hr. How long will it take to drive home at 100 km/hr?
18. Two hydraulic shovels make the trench for a telephone cable in ten days. How long will it take to make the trench with 5 shovels?
19. Three tickets to a concert costs 60 euros. How much would five tickets cost?
20. A cyclist takes 6 minutes to cover 2 kilometres. How long would he take to cover 15 km?
21. A factory produces 1,400 pairs of trousers in one week (7 days). How many pairs of trousers does it produce in one month (30 days)?
22. A driver takes 3,5 hours to drive 329 km. How long will it take another trip in similar conditions as the previous one, but travelling 282 km instead?
23. A 300 gr wedge of cheese costs 6 euros. How much would a 450 gr wedge of cheese cost?

Percentages

24. The population of a town is 652000 and 35% of them live in the centre district. How many of them live in this district?
25. 15% of the players in a football team have injuries. If the team has 20 players, how many players have injuries?
26. A cake weighs 1,200 gr. 10% of the cake's weight is butter. How many grams of butter are in the cake?
27. How much does a PS3 cost if its original price was 300 euros but a discount of 15% has been applied?
28. A hotel has 50 rooms and 35 of them are occupied. What percentage of the hotel's rooms are occupied?
29. 60 students at a school have signed up for a chess tournament. If they represent 15% of the total number of students, how many students does the school have?
30. In the class 13 students didn't do their homework; this was 52% of the class. How many students are in this class?
31. In a sale the price of a television set is 150€ which is 65% of the usual price, what was the original price?
32. The 6% of the population of Las Cabezas are immigrants and there are 960 immigrants living in our town, what is the population of Las Cabezas?
33. The price of some clothes is 68€ and there is a discount of 7%, what is the final price?
34. The population of a town is 63500 and last year it increased by 8%, what is the population now?
35. Last year there were 1560 employees in a company, this year 234 new people have been employed. What has been the % increase of the staff in the company?
36. The net salary of an employee is 1230€ after paying 18% tax, what is the gross of his/her salary?
37. I have bought a pair of jeans for €24.20, the VAT is 21%, what was the price before VAT?

