# What’s the variable?

### Example

Connor has four times as many books as Jack. If Connor gave 18 of his books to Jack they would both have the same number of books. How many books does Connor have?

### Questions

1. A man is 32 years older than his son. Ten years ago he was three times as old as his son was then. Find the present age of each.
2. 103 litres of oil and 17 litres of water weigh the same as 3 litres of oil and 105 litres of water. A litre of water weights one kilogram. How much does a litre of Oil weigh?
3. My cat is quite old, and has had the same weight for a very long time. My dog, when he was a puppy, weighed 2kg more than my cat. Now he weighs 10kg more than my cat. In fact my puppy’s weight has doubled in this time. What is the weight of my cat?
4. I have some sweets. Henry has 10 fewer sweets than I do and Luke has 20 more than I do. Jake claims that he has twice as many sweets as Luke and four times as many sweets as Henry. How many do I have?
5. A gambler has some money. If he were to lose £5 and then double this new amount he would have the same amount of money as if he won £10 and then lost half of this new amount.
6. A bus has 52 passengers. When it arrives at the first stop some people get off and 4 get on. At the next stop one third of the passengers get off and 3 get on. There are now 25 passengers on the bus.
7. I am 6 years older than my brother. 11 years ago he was one third of my age then.
8. The height of a triangle is 3 cm more than the width. The triangle’s area is 5 cm2.
9. “Heavy water” is the common name for Water enriched with Deuterium and used to control the explosive reaction inside a nuclear bomb. 5 litres of heavy water and 13 litres of standard water weigh the same as 15 litres of heavy water and 2 litres of standard water.
10. I am 6 years older than my brother. 11 years ago he was one third of my age then. How old will I be in 15 years’ time?

Jack, John, Josh, James, and Jeremy Jameson are all sons of Jim and Jane Jameson.

1. In 22 years’ time, Jack will be 3 times his current age. How old is he now?
2. John will be twice his current age when Jack is 20.
3. In thirteen years Josh will be three times the age he was 7 years ago.
4. James was a third of his current age a decade ago.
5. Jeremy’s age is the mean of the other four ages.
6. Put the children in age order.
7. Laurie has two long planks of wood, both the same length. He needs to cut them into nine shelves, each of the same length. He cuts six shelves from the first plank, and he has 15cm of wood left over. He then cuts three shelves from the second plank and has 135cm left over. How long was each shelf?
8. Go back to the extension problems from Forming and Solving B

# General Solutions

In each question, form an equation by defining a variable, then make your variable the subject to give a general solution to the problem.

1. In  years’ time, George will be  times his current age. How old is he now?
2. I had  bags of boiled sweets. I then gave  sweets to my brother. I was left with 6 bags of sweets. How many are there in a bag?
3. I buy  identical tins of paint, and pour the contents into a tub. I add  litres which I find in my garage, and now have  times as much paint as I started with. How many litres of paint were in each tin?
4. Richard has  times as many books as John. If Richard gave  of his books to John they would both have the same number of books. How many books does John have?
5. A man is  years older than his son. years ago he was  times as old as his son was then. Find the present age of each.
6. My cat is quite old, and has had the same weight for a very long time. My dog, when he was a puppy, weighed kg more than my cat. Now he weighs kg more than my cat. In fact my puppy’s weight has doubled in this time. What is the weight of my cat?
7. I have some sweets. Bob has  fewer sweets than I do and Charlie has  more than I do. Derek claims that he has  times as many sweets as Charlie and  times as many sweets as Bob. How many do I have?
8. A gambler has some money. If he were to lose £ and then double this new amount he would have the same amount of money as if he won £ and then lost half of this new amount. How much does he have?
9. My cat is quite old, and has had the same weight for a very long time. My dog, when he was a puppy, weighed kg more than my cat. Now he weighs kg more than my cat. In fact my puppy’s weight has doubled in this time. What is the weight of my cat?
10. litres of oil and  litres of water weigh the same as  litres of oil and  litres of water. How much does a litre of Oil weigh?
11. I have some sweets. Henry has  fewer sweets than I do and Luke has  more than I do. Jake claims that he has  times as many sweets as Luke and  times as many sweets as Henry. How many do I have?
12. I am  years older than my brother.  years ago he was % of my age then. How old will I be in  years’ time?

# What’s the variable - Homework

In order to solve each problem

1. Decide which is the best variable to set and start with “Let x be…”
2. Form an equation, then solve it.
3. Give the solution in sentence form.
4. Ben has three lumps of gold. The first block weighs 10kg more than the second, which weighs 10kg more than the third. In total they weigh 345kg. How heavy is each lump?
5. Fred is 30 years older than his son. In ten years, Fred will be twice as old as his son is then. How old is Fred’s son now? *“Let x be the \_\_\_\_\_\_ of Fred’s \_\_\_\_\_\_\_\_ …”*
6. I have some sweets. Natasha has 8 fewer sweets than I do and Tim has 10 more than I do. Mark claims that Tim has four times as many sweets as Natasha. How many do I have?
7. In London zoo, the oldest giraffe is quite old, and has had the same weight for a very long time. The newest elephant, when it arrived, weighed 200kg less than the giraffe, but now he weighs 300kg more. In fact the elephant’s weight has trebled in this time. How heavy is the newest elephant now?

Answer box:

|  |  |  |  |
| --- | --- | --- | --- |
| 105 | 20 | 14 | 750 |

In each question, form an equation by defining a variable, then make your variable the subject to give a general solution to the problem.

1. Last week I had  packets of fish-fingers in my freezer. I ate  fish fingers yesterday and now have  left. How many were there in a packet?
2. During a diet I lost kg in weight. I now weigh kg. How much did I weigh before?
3. I have  sacks of potatoes. I remove  potatoes from each sack. I now have  potatoes in total. How many potatoes were there in each sack?
4. Every week I put the same amount of money in my piggy-bank, to save for a rainy day. Three weeks ago I had  and I now have . How much goes in every week?
5. I have  boxes of chocolates. I eat  chocolates from each box, and now have  chocolates in total. How many chocolates were the originally in each box?
6. If I buy  identically priced DVDs on Special offer, I receive a discount of £. When I go to the till, I have to pay . How much did each DVD originally cost?
7. A Pirate has seven identical bags of gold coins. In his next raid he manages to acquire  extra coins and divides his total fortune equally among the  pirates on board his ship. If each pirate receives  coins, how many were in each bag?
8. I buy  packets of sweets. I pour all of them into a container which already contained  sweets left over from my last shopping trip. I now have  sweets in my container. How many sweets were in each packet?
9. \* I have  tubes of Smarties, which I open, and pour into a bowl. I eat  Smarties, and then share the rest between my  brothers. If they get  Smarties each, how many were there in each tube?

Answers

Jack 11

John 9

Josh 17

James 15

Jeremy 13

So

John

Jack

Jeremy

James

Josh