# Forming Equations

## Section A: Define variables before you form the equation.

1. Amy buys a bag of apples from the shop. She eats some but still and has a few left.
2. I buy some sweets and then give the same number to each of my nephews, leaving me with only a few at the end.
3. Jamie buys some boxes, each of which contains the same number of chocolates. He eats a few chocolates, but still has some left.
4. I buy some sweets and share them equally between some friends and myself, which means we each get a few sweets.
5. I travel for a particular distance in a particular time at a constant speed.
6. I have two different packets of nuts (one of pistachios and one of cashews). I mix them up and then share the result amongst some bowls.
7. The perimeter of a square (in cm) is twice as large as its area (in )



## Section B In these questions you just need to define one variable.

1. I think of a number, multiply it by 9, and add 12. This gives me 165. *“Let x be the original number”* and form an equation to represent this situation.
2. Last week I had 5 packets of fish-fingers in my freezer. I ate 10 fish fingers yesterday and now have 45 left. *“Let f be the number in each packet”…*
3. During a diet I lost 5kg in weight. I now weigh 82kg. Form an equation for my previous weight
4. I have 3 sacks of potatoes. I remove 12 potatoes from each sack. I now have 99 potatoes in total. Form an equation for the number of potatoes in each sack.
5. Every week I put the same amount of money in my piggy-bank, to save for a rainy day. Three weeks ago I had £2.50 and I now have £3.25. Form an equation for the amount I put in each week.
6. I have 8 boxes of chocolates. I eat 3 chocolates from each box, and now have 72 chocolates in total. Form an equation for the number of boxes of chocolate.

## Section C: Think carefully about which variable to define here.

1. 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.
2. 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.
3. I am 6 years older than my brother. 11 years ago he was one third of my age then.
4. The height of a triangle is 3 cm more than the width. The triangle’s area is 5 cm2.

## Section D: Form an equation which could help you solve each of these problems.

1. If I buy 5 identically priced DVDs on Special offer, I receive a discount of £10 in total. When I go to the till, I have to pay £64.95.
2. A Pirate has seven identical bags of gold coins. In his next raid he manages to acquire 37 extra coins and divides his total fortune equally among the 11 pirates on board his ship. Each pirate receives 60 coins.
3. I have 2 tubes of Smarties, which I open, and pour into a bowl. I eat 7 Smarties, and then share the rest between my 3 brothers. They get 11 Smarties each.

3*x* + 1

2*x* – 1

x + 4

1. If half the perimeter of the triangle is 11cm, find the length of the shortest side.
2. Paul has some money in his wallet. He is given £5 by a friend and then his mother kindly doubles the total amount he has. He then has £30.
3. 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.
4. A father has some money. He then finds £10 more in his pocket and divides the total equally amongst his 3 children. Each child gets £6.
5. A group of three schoolboys decide to pool their money to buy some Maltesers. They send a boy to buy them, and he gets four packets, each with the same number of Maltesers in. On the way back, he surreptitiously eats 2 Maltesers from each packet. When the remaining Maltesers are divided equally amongst the three boys, each gets 8.

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# Forming Equations - Homework

1. I have 10 identical bags of marbles. I lose 15 in a game and am left with 65 in total. Let x be the number in each bag and form an equation to represent this situation
2. I think of a number, multiply it by 11 and then add 13. My answer is 145. Let x be the number I am thinking of…
3. I have 4 boxes of eggs, but in an unfortunate mishap, I break 11 eggs. I am left with 21 eggs in total. Form an equation to represent how many were in each box originally.
4. Edward has some marbles. He loses half of them in a game with his friend Fred. He then drops 3 more marbles on the way home. When he gets home, he has 8 marbles.
   1. Form an equation to represent how many he started with.
   2. Solve this equation to work out how many he started with.
5. John has some Maltesers. After winning a bet with his friend Jason he has four times as many. He then eats 7 and is left with 17.
   1. Form an equation for the amount he started with.
   2. Solve this equation to work out how many Maltesers he had.
6. I had a jar containing 45 marbles. For 3 weeks my nephew demanded the same number from me for his collection. I now have 15 left. Form and solve an equation to represent how many marbles did he gets each week.

Solve each of these problems by forming an equation, then solving it.

1. Albert has 6 identical punnets of tomatoes. He pours the contents into a bowl, eats 4, and then shares the remainder between his 5 grandchildren. If they get 10 tomatoes each, how many were in each original punnet?
2. I did have five bottles of fizzy drink. I drank a 200ml glass myself and then poured the remainder into five 100ml glasses. How much fizzy drink was there in each bottle?
3. I have 7 bags of humbugs. I eat 14 humbugs. I share the rest equally between my 5 grandchildren. Each child is given 21 humbugs. How many humbugs were originally in each bag?
4. \*During an armed robbery I steal 142 bags of pound coins. On returning to my house, I put the loot into a safe which already contains 106 pound coins. I now have in total 2946 pound coins. How many coins were in each bag?
5. \*Fred and five friends are playing marbles. Fred has a good run, and manages to win 12 marbles from each of his five friends. Being a nice chap however, he then shares all his marbles equally between the six of them. If they each get 13 marbles from this, how many marbles did Fred have to start with?