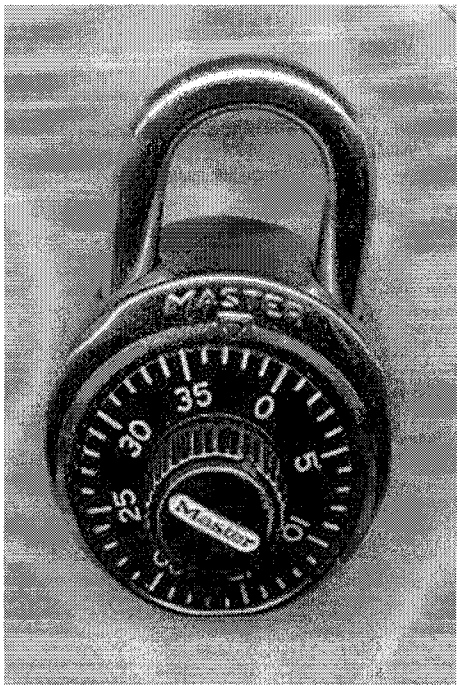


How To Crack A Master Lock Combination

Use the Master Lock Combination Cracking Widget!
Once you have the sticking points for your lock (learn how to get these below if you don't have them yet), use the Master Lock Combination Cracking Widget to figure out the last number and to compute the possible first and second numbers in your combination...

Introduction

I must have learned how to do this my senior year in high school. It has helped me many times to open one of my own locks whose combination I have forgotten. I'm sure there are other times when this can come in handy too. For example, you can entertain your friends (or scam your unsuspecting foes with a wager) by unexpectedly opening a lock in a number of minutes. I've also used this skill to fill up a friend's locker with balloons on her birthday.

I have decided that it is about time for me to share my wisdom on a grander scale. As with any form of knowledge about how the world works, this skill can be used for good or for evil. I can't say that I haven't jacked my friends' lockers numerous times, or even gotten into things I shouldn't have, but it's up to you to decide how you will use this power. There is nothing wrong with the skill itself, nothing dirty or illegal or anything like that. A lock is just a system to experiment on until we, the scientists, figure out how it works. Think of it as a challenge, with a nice reward at the end.

The Good Stuff

Okay, so let's get to the trick already! You'll need to have a lock you already know the combination to in order to practice. It also helps if a friend has a lock that you don't know the combination to (but he does) to verify that you have acquired the necessary skills as you go along.

- First, we have to figure out the last number in the combination.

This is pretty simple once you get the hang of it, but can be tricky if you're just starting out. It involves pulling the "U" shaped part, or arm, away from the main body of the lock. Try this: with the lock closed (i.e. locked), pull the arm out as far as it can go. While continuing to pull arm out, try to rotate the dial of the lock. You will notice that the dial will "stick" at a particular position. You can release the arm now (phew!). If you rotate the dial a little bit, and try the same thing over again, you will find that the lock sticks in another place! Now the question is, are there a finite number of places where the dial sticks? [Geoff Menegay writes me that on his older Master Lock, there is only one sticking place, but it slides between two digits (i.e. goes between 23 and 25). In this case, the last number turns out to be the number in the middle (i.e. 24). Thanks Geoff!]

- There are only twelve sticking points.

The reason that we care about the sticking points is that one of the points is the last number in the combination! Confirm this for yourself, since you already know the last number of the lock in front of you. The lock will stick on the last number. Okay, now the question is how to single out the last number from all of the "fakes" that Master Lock has put there to try to trick us. There are basically two types of sticking points, ones that stick ON a mark and those that stick BETWEEN marks on the dial. The distinction is crucial, so you should practice a little bit now identifying and contrasting the two types. Once you've learned how to distinguish the two types, you can reduce the number of possible last numbers from twelve to five!

At this point, since you know the sticking points, you can use the Master Lock Combination Cracking Widget and/or continue reading...

- All seven of the points that stick BETWEEN marks are FAKE.

So, this leaves us with five points left. Four of the five numbers that the dial sticks ON have the same one's digit place. For example, the numbers 5, 15, 25, and 35 all have the same one's digit.

- The SAME ONE'S DIGIT sticking points that stick ON a mark are FAKE.

That leaves us with just one sticking point, and thus we have found the last number in the combination! Try this out for yourself on your lock. After you figure it out, practice this on a friend's lock that you don't know the combination to (but that he does) and see if you can get the last digit right. Once you master this skill, give yourself a pat on the back! We're done with the challenging part (hurray!).

- After we have the last number, we get the first two numbers with a little math and a lot of brute force.

Once we know the last number, there are only ten possibilities for the first number and ten possibilities for the second number, for a total of one hundred possible combinations. This might seem like a lot, but compared to the theoretical sixty-four thousand possibilities we've made a lot of progress. So, what are the possible values for the first and second numbers?

Use the Master Lock Combination Cracking Widget and/or continue reading...

- The key to the first and second numbers is the modulus mathematical operator.

Whoa there, don't let the name of that scare you away! The modulus operator is just dividing one

number by another and the remainder is the modulus. Anyone can do this, and you probably had to take remainders and such in grade school. The modulus operator isn't any different, it just has a fancy name.

- Some examples and notation of the modulus operator.

Notation: (a%b)=c

Translation: c is the remainder of a divided by b

Examples: (35%4)=3; (2%4)=2; (5%4)=1; (16%4)=0. Got it? Good.

- The first number modulus 4 is the same as the last number modulus 4.

For example, let the last number of the lock be 33. Then (33%4)=1, so we know that (first number%4) =1 as well. This means that the only possible values for the first number are: 1, 5, 9, 13, 17, 21, 25, 29, 33, and 37. Note that there are only ten possibilities. This is because dial only has 40 marks, and by enforcing the modulus operator we essentially are dividing the possibilities by 4. Try this out on your own lock, and verify that the (first number%4)=(last number%4).

- The second number modulus 4 is the last number modulus 4 plus or minus 2.

If the last number modulus 4 is 0, then the second number modulus 4 is 2, and vice versa. If the last number modulus 4 is 1, then the second number modulus 4 is 3, and vice versa. Let's continue our example above, with the last number equal to 33. (33%4)=1, so the second number modulus 4 is equal to 3. This means that the possible values for the second number are 3, 7, 11, 15, 19, 23, 27, 31, 35, and 39. Again note that there are only ten possibilities. Try this out on your own lock, and verify that the (second number%4)=(last number%4)+-2.

- Going through the one hundred possibilities takes a little time, and a little effort not to forget where you are in the sequence of possibilities.

The exact sequence or order of possibilities that you try out is really a matter of self preference. What ever is easiest for you is what will work best. On average, you will have to go through 50 possibilities before you figure the combination out, regardless of the sequence you choose. I personally like to go in ascending order with the first number varying the fastest. In our example above with the last number equal to 33, my sequence would look like {1-3-33, 5-3-33, 9-3-33, ..., 1-7-33, ..., 1-11-33, ..., 37-39-33}.

- How quickly you can crack a lock depends on how quickly you can go through about fifty combinations.

Personally, it takes me about five to ten minutes to crack a lock. I don't really time myself or anything, but that is about how long it takes on average. I have had a combination that opened on the first couple of tries, and ones that were at the very end of my sequence. Some times you just get lucky. As a final drill, try to figure out your friend's combination. Once that lock arm slides open (at least for me), it's a rush.

- One quick word of wisdom.

Getting the last number right is crucial to this whole process. If you have the wrong last number the rest of your time will be wasted. So take your time here and be confident. Sometimes rechecking once or

twice isn't a bad idea, and it will save you a lot of time in the long run. Also along those lines, watch out for old locks that have been beaten up a little bit. Sometimes the dial can be shifted a little, so sticking points between marks appear to stick on the marks and vice versa. There should always be more between sticking points though, so this should be a clue if a shift has taken place.

- Notes on applicability of this trick.

This method only works on Master Lock combination locks as far as I know. I would guess that other brands of locks work in the same way, but I do not claim to be able to crack them.

- Quick Summary (a real Example)

If you can follow this wrap-up, you should be well on your way:

The 12 Sticking Points of my lock were found to be:

Between two digits: 1.5, 8.5, 11.5, 18.5, 21.5, 28.5, 38.5

On a digit: 5, 15, 25, 32, 35

-> Last Number = 32

-> Possible First Numbers: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36

-> Possible Second Numbers: 2, 6, 10, 14, 18, 22, 26, 30, 34, 38

(turns out my combination is: 36-18-32)

- Have Fun!!!

Links to related pages

Master Lock Combination Cracking in the News. Wilmette Police give warnings on combination lock fallibility

A quick tutorial on drilling Master Combination Locks. Ben McIntosh's Master Combination Lock Drilling Tutorial

Here is another great page about cracking master locks. It uses more or less the same method as I present above, but in some ways is more extensive than my material. In addition, it contains information for cracking older master locks, and other kinds of lock/code breaking stuff. MasterUnLock.com (This link is defunct currently.)

The Master Unlocked Page

A cool page on a mechanical combination lock cracker: Locraker.

NEW! Here is a master list of all possible master lock combinations, organized by the last number in the combination. It fits onto one printed sheet, making it extremely portable. Composed by *Joel Lueders*.

The company that developed the lock that you can now crack: The Master-Lock Company

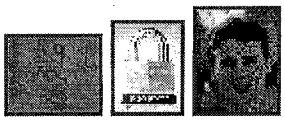
---

Sign the Master Lock Combination Cracking Guestbook!

This page has been accessed [×] times since the last time the counter reset itself

---

The picture at the top of this page was given to me by Nyle Steiner, replacing the old picture of the key lock. Thanks Nyle!



Nathan Hillson / 19-JUN-00 / Comments to hillson@fas.harvard.edu