
# Road Rallying in Maritime Canada

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# What is a Road Rally?

A car rally is a form of car-based competition that is fun and challenging, while maintaining a high level of safety. A team of two, made up of a navigator and a driver use a set of instructions to follow a specific route. A further complication is that they are required to maintain a specific average speed (always below the posted limit). At intervals along the route, the organizers will have set up secret control locations. When the competitors encounter one of these checkpoints, their time will be checked and a score computed based on an ideal time. They will then proceed along the route to the next checkpoint where the process is repeated. The team is awarded penalty points if they arrive earlier or later than their ideal time. When all these points are added up at the end of the rally, the team with the lowest score is declared the winner.

The challenge in a road rally is following the route instructions and maintaining the assigned speeds. Success requires teamwork. The navigator interprets the route instructions and instructs the driver while also ensuring that the correct speed is being maintained. Teamwork is crucial!

When designing the route, organizers make sure to set average speeds below the speed limits for the road. Competitors should never feel the need to speed or drive unsafely to meet time goals. The goal of a Road Rally is precision, not risk.

Other names used for a Road Rally are Navigational Rally, Navex Rally or TSD (Time, Speed, Distance) Rally.

# What do I need to compete?

The first requirement is a road legal vehicle. Almost anything will be fine. Organizers will usually identify a road rally as being tarmac only, or tarmac and gravel. A low riding sports car is probably not a good choice for a tarmac and gravel rally, but any other vehicle should be good. If you plan to use a low riding vehicle, you will likely be limited to tarmac only events. If you are unsure, ask the organizer. They have the experience and knowledge of the route and can make recommendations.

The driver must be legally allowed to drive. The navigator does not require a driving license and can be any age. Young navigators may need a parent to sign a waiver before they can take part. Both team members must be members of one of the regions motorsport clubs. One day memberships are usually offered at a very reasonable price.

It is possible to compete with no additional equipment for the navigator. Just follow the route, use the vehicle's odometer to track distance and drive about 5% above the designated speed to account for slowing for stop signs, turns etc. This should get you close to the ideal time.

In practice, most navigators will have at least pens, paper and a clock/watch set to official rally time. Useful additions include:

1. A separate odometer. In the past, these were mounted in the vehicle and connected to a device that detects wheel revolutions. A simpler approach is a smartphone app that uses GPS to determine distance travelled. Ideally, the odometer allows for calibration so that it can be set to agree with the odometer used to create the route. The first part of the rally is used to check odometer calibration. Having their own odometer saves the navigator from continually asking the driver 'Are we there yet?'.
2. For a night rally, a small light is useful for reading the routebook etc.
3. A calculator. Useful for timing calculations and for calculating distances.
4. Safety items in the vehicle such as warning triangles, fire extinguisher and a shovel (for winter rallies) are useful additions.


## Road Rally Competition Classes

Teams are divided into two classes, Novice and Experienced. New teams will start in the Novice class. Many organizers will provide different instructions for each class. This keeps the instructions simpler for the novice teams allowing them to concentrate on the basics and develop experience while still challenging the experienced teams.

## What are the rules?

The fundamental rule is to drive safely and within the law. Other rules are located in two places:

1. ARMS Navigational Rally Rules. These define general rules related to rallying in the region. These lay out the ground rules for all Road Rallies run in the region. They are essential reading for a road rally organizer, less so for competitors.
2. Supplemental Regulations (Supp. Regs.). These are specific to an event and are on the ‘must read’ list for everyone. They will include information about start and

finish locations, start times, rally length and expected duration and how the rally is timed and scored. The Supplemental Regulations will also explain how to register for the event. You can usually register on the day of the event but check the Supp. Regs. It's easier for the organizer if you register ahead of time. The Supp. Regs. will also tell you how waivers are being handled. Usually that will be through a web link that will send information to your phone via SMS. Follow the instructions to complete the waiver. You will be asked for proof of this at registration.

Electronic waivers are often good for a whole year, but you may need to go through the process again if this rally is organized by a different club.

# Before the Event

Before the rally, make sure your car is roadworthy. You will want to be sure your wipers and washers are functioning properly (rallies run in all weather), all lights are working, your gas tank is full for the start and your tires are correctly inflated.

The navigator should gather their equipment together, including a selection of pens and pencils.

Read the supp regs. Make sure you have enough outlets in the car for all the technology you are using. If you need a specific app for the rally, make sure it is loaded and you have a phone dedicated to that app.

# What Happens on the Day

## Registration

The day will start with registration, even if you pre-registered. Details of driver and navigator will be confirmed, driver's license, vehicle registration and insurance will be checked. If you do not own the vehicle you must provide written permission from the registered owner. An assigned scrutineer will likely check that your vehicle has a valid Motor Vehicle Inspection sticker (assuming that applies). You will also be assigned a car number.

## Drivers Meeting

Usually 15-30 minutes before the first car starts the rally, there will be a compulsory meeting of all competitors. The organizer will inform everyone of last-minute changes to

the route and/or instructions. The navigator should bring pen and paper to make notes. It is also a chance to ask questions and listen to questions asked by more seasoned competitors. After this meeting is a good chance for last minute checks and visits to the washroom.

## The Start

You calculate your start time from your assigned car number. Usually this will be by taking the Car 0 time and adding your car number of minutes to that time. If you are car 6 and Car 0 starts at 13:00, you start at 13:06. (Occasionally the organizer will start cars 2 minutes apart, in which case your start time is 13:12.). You will be given your route instructions one or two minutes before your start time. Pull up to the start line just before your start time and leave at your designated time.

Usually the first section is very simple as it is used as the Odo Check (so you can calibrate your odometer). You will follow the assigned route and stop at a very specific point. The instructions will tell you what the ‘official’ odometer reading is at that point. You can compare that with your odometer reading. How to use this information is discussed later. For this section an elapsed time will be given. Add the elapsed time to your start time and that will tell you what time to leave the odo check location. If you

need to wait for more time before leaving, pull ahead slightly so that the next team along can stop at the exact odo check location.

## After The Odo Check

Once the departure time is reached leave the odo check location. It is good practice to leave a few seconds early to allow for time lost while getting up to speed. The next instruction should contain a CAS (Commence Average Speed) that tells you the speed at which you should be travelling.

The rules for Road Rallying driving are, in order of priority:

1. Stay on the road
2. Stay on the route
3. Stay on time

The first one is mostly up to the driver, 2 and 3 are mostly up to the navigator! At this point follow the route and stay on time.

We have glossed over the routebook but we will come back to that in detail later.

## CheckPoints

Once you have left the odo check you will eventually arrive at a checkpoint. These are the points on the route where you time is recorded, and you are awarded penalty points for being early or late. In theory, you only need to be exactly on time at the checkpoints… but you don't know where they are!

A rally will typically use one of two styles of checkpoints, the supp regs should tell you which type is being used.

### Open Checkpoint

An open checkpoint is identified by a vehicle parked by the side of the road with a checkpoint sign displayed (you will be shown one at the driver's meeting). There is a standard procedure used at these checkpoints, most of this is based on safety considerations so following it is important. If the rally uses open checkpoints, you will be issued a time card at the start where the checkpoint volunteer can write your arrival and departure times.

1. Drive past the checkpoint vehicle. If you think you are running ahead of ideal time you may slow down, but you must not stop.
2. Pull to the right as far as possible and stop. (Not into the ditch, especially in winter!)

3. One of the crew (usually the driver, but not always) walks/runs back to the checkpoint car taking the time card so that the checkpoint worker can fill in the time you passed the control board (checkpoint sign). That time sticker will also tell you what time you should leave the checkpoint. You will have some time here, depending on how many cars arrive close together. Your score for that first segment is now in the books. Whether you were early or late is of little consequence. You cannot make up for lost time. This is to prevent speeding or other unsociable behavior.
4. On your out time (or 10 seconds before), you set out again and continue until you reach the next checkpoint where these steps are repeated. Your ideal time for the next checkpoint is calculated from your out time of this checkpoint.

### Closed Checkpoint

You do not stop at a closed checkpoint; you just continue driving. Timing may be done by a person hidden from the road, but is much more likely to be done with a smartphone app. Which app is needed and how to access it will be described in the supp regs. (another reason you must read them). Typically, the app will ping to indicate you have passed a checkpoint and display the relevant information and possibly your score. Again, any penalties cannot be corrected and future timing is based on the time you passed the checkpoint.

## Timing

Road Rallies are usually timed such that any timing errors are reset at a checkpoint. The time you leave (or pass) a checkpoint is used as the basis for timing calculations at the next checkpoint. This means, if you arrive at a checkpoint late, do not try to make up that time when you leave (or pass) it, if you do you will be early at the next checkpoint and get more penalties. As you leave or pass a checkpoint, start driving at the required average speed.

A road rally will be described as ‘timed to the minute’, ‘timed to the second’ or similar.

An event that is timed to the minute will award penalty points based on how many minutes you are early or late at a checkpoint. Checkpoints will be placed so that you should arrive on the top of the minute, i.e. a time that has 00 for the seconds. There are no penalty points if you arrive any time within the minute that starts at the exact time. For example, if the checkpoint is placed such that you should arrive at 13:42:00, if your arrival time at the checkpoint is between 13:42:00 and 13:42:59 you will receive no penalty points. If you arrive at 13:41:59 or 13:43:00 you will be given one penalty point. Simply put, if timed to the minute, only hours and minutes of the time count.

You can arrive 59s late with no penalty, but if you arrive 1 second early you will get a penalty point. Most teams aim to run a few seconds behind the ideal time in this scenario.

If an event is timed to the second you need to arrive at the checkpoint within the second that starts at the ideal time. This is obviously much tighter timing and you just try to stay on the ideal time.

## Sections

A Road Rally is usually divided into a number of sections. The instructions will tell you where each section ends. The route book will define the end of each section and the start of the next, they will usually be the same place. You will almost always zero your odometer for each new section, but time continues running. Unless the route book says otherwise, there is no rest time between sections.

For a longer rally, sections may be grouped into ‘legs’. There is usually a break between legs at a location where you can eat, use the bathroom and refuel. The Car 0 start time will be stated in the route book and you can calculate your start time in the same way you did at the start of the rally.


## End of the rally.

The last few km of a rally will usually be an elapsed time portion. This means you have a set time to cover the distance. This is the one occasion you can arrive early without getting penalty points. You calculate your ideal arrival time based on the last checkpoint. All you need to do is arrive earlier than that time and then request the ideal, calculated,

checkpoint time. If you calculate an ideal time of 15:45 but you arrive at 15:43, you request a time of 15:45 and that will be used as your rally end time. You cannot request a time earlier than your arrival time. This process avoids a bunch of cars waiting on the road just outside the finish venue.

When you arrive at the checkpoint (usually inside the restaurant where the rally finishes), you hand in your timecard, if there was one, and request your ideal finish time.

Now, order some food, socialize with the other competitors and wait for the other teams to arrive. After some time, results will be announced and responsible celebrations can begin.

# Appendix A – Routebooks

The routebook contains the instructions that will guide you through the rally route. In this section we are discussing typical novice level routebook instructions. At the experienced level the organizer might introduce additional challenges such as putting things in the wrong order, using more obscure methods of defining which way to turn. They may pride themselves on developing novel ways to define the route. The goal is to add to the navigator's workload and to try to force mistakes. Novices are generally spared such things and are given straight forward instructions.

What we have outlined here is the usual approach to road rally instructions in the Maritimes. Rally organizers may deviate from the usual approach so always read the routebook carefully. For teams at the experienced level, the organizers are very likely to include a few 'tricks' in the routebook.

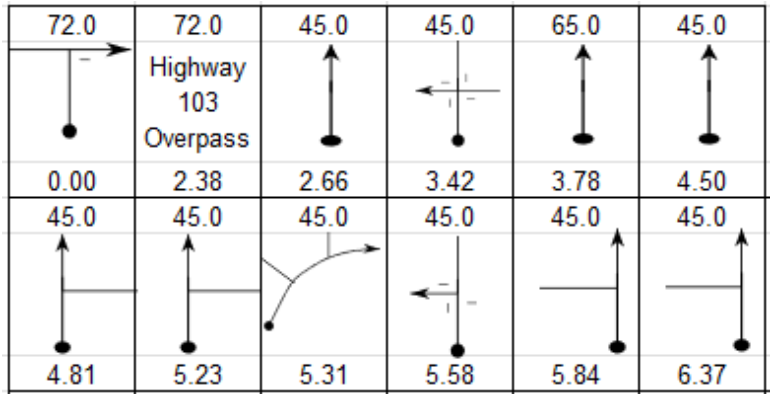
The routebook will typically start with a general introduction that defines the meaning of the information on the following pages. It may be as basic as defining the units used for distance or may list the definition of abbreviations, e.g. S Tee R means Stop Tee Right, an instruction to stop at tee junction and then turn right.

After that will be the route instructions for each section, typically 1 page per section. Each instruction will have a corresponding distance, usually a distance from the start of the section (accumulative distance) and the distance from the last instruction. It will also show the assigned speed and turn instructions. Here is an example:

| Accum. Distance | Non Acc. Distance | Speed | Instruction |
|---|---|---|---|
| 0.00 | 0.00 | 37.0 | R - Conrad Rd |
| 1.10 | 1.10 | 43.0 | SA - Chesley Rd. |
| 2.71 | 1.62 | 43.0 | L - Copeland Rd |
| 3.71 | 1.00 | 46.0 | Gravel -> Paved |
| 4.49 | 0.77 | 46.0 | Slight R - Copeland Rd |
| 5.43 | 0.94 | 72.0 | STeeR - Highway 10. Start TWRT for 5.0km. |
| 7.09 | 1.67 | 72.0 | SA - Conrad Rd. |
| 10.36 | 3.26 | 65.0 | R - North River Rd |
| 17.53 | 7.17 | 65.0 | STeeR - Cherryfield Rd |
| 26.06 | 8.53 | 48.0 | L - Camel Hill Rd., East Dalhousie Rd |
| 27.97 | 1.91 | 48.0 | Bridge |
| 31.45 | 3.47 | 48.0 | Bridge |
| 33.84 | 2.40 | 65.0 | STeeL - Ridge Rd |
| 36.46 | 2.61 | 55.0 | R - Hastings Rd |
| 39.58 | 3.12 | 55.0 | L - Springfield Lake Rd. |
| 40.76 | 1.18 | 72.0 | EOS 3 STeeL - Highway 10 |

Accumulative distance is the distance from the start of the section. Non-accumulative distance is the distance from the previous instruction. Sometimes only one  or the other is given. One can be calculated from the other.

Another common routebook tool is Tulip diagrams. These are a simple diagram of each turn. You enter the diagram at the dot and leave by the arrow. Here are some examples:




The numbers above the tulip indicate the required speed and the number below the distance to the turn from the start of the section. This would all be explained in the introduction to the section.

Some sample routebooks are provided at https://roadrallyatlantic.ca/docs-and-regs/ .

# Appendix B: Rally Computers

A rally computer's main function is to provide an accurate odometer that typically has a number of features not found in the vehicle odometer. These include:

1. It is mounted so that the navigator can see/control it.
2. They display distance to more than one decimal place.
3. The odometer can be calibrated so that the distances match those found in the rally routebook.
4. They can run forwards or backwards. If you go off course, you can turn round, set the odometer to run in reverse and retrace your route back to the course.
5. The distance can be set to any value. If you go of course and get lost, when you get back on course you can set the odometer to the routebook value at the next turn and carry on.

In the early days of rally computers, they were driven from a gearbox inserted in the middle of the vehicle's speedometer cable and were completely mechanical. Changing calibration required changing gears inside the unit. Once electronics became viable, rally computers were driven by a wheel rotation detector mounted on one wheel of the vehicle. Distance was determined by counting wheel revolutions. The user could set the number of wheel revolutions per distance unit (km or miles).

Currently, the easiest rally computer to use is a smartphone app that uses the phone's GPS to determine location. This approach requires no connection to the vehicle, other than power to keep the smartphone charged. The different approaches have pros and cons. When starting out, the smartphone app is the easiest way to go.

Find a suitable app for your smartphone, mount the smartphone so the navigator can see it and give it power so that it lasts for the whole event and you are ready to go.

Useful additions to the rally computer, beyond being an odometer, are:

1. Speed display. This is usually more accurate than the vehicle speedometer. Most useful if the computer is mounted so that the driver can also see it.
2. Average speed display. Displays the average speed of the vehicle since the last reset. You reset it whenever the speed changes in the routebook and then the driver maintains the correct average speed.
3. Multiple odometers. The secondary odometer can be used to measure distances within a section and can be useful for timing calculations.

The table below lists a few rally computer apps that are worth investigating. We are not making any recommendations because apps change all the time, usually for the better, but sometimes for the worse.

| App Name | Android | IOS | Cost | Comments |
|---|---|---|---|---|
| Rally Rabbit | * | | Free | |
| Richta Simple Rally Odometer | * | * | $12.99 | |
| | | | | |

# Appendix C. Speed Calculations

If you are just using your vehicle's odometer or using a rally computer with no average speed display, you will need to calculate the time you need to be at each location. There are two common ways to do this, calculation or with speed tables.

## Calculations

The relationship between time, distance and speed can be expressed in different ways depending on what you want to calculate. These are:

$$Time = \frac{Distance}{Speed}$$

$$Speed = \frac{Distance}{Time}$$

$$Distance = Speed\ x\ Time$$

Usually you need to calculate the time as you know the distance and speed. Let's work an example.

The routebook tells you to travel at an average speed of 54 km/hr. The next turn is in 2.3 km. How long should it take to travel 2.3km at 54 km/hr. Using the first equation we calculate distance/speed which is 2.3/54 hr, since we are using speed in km/hr and distance in km, the time we calculate is hours. Doing the calculation gives 0.0426 hr. We need the time in a more useful unit. To convert to seconds, multiply by 3600. That gives 0.0426 x 3600 = 153.3 seconds. Since there are 60 seconds in a minute, that is 2 minutes 33.3 seconds, more conveniently written as 2:33.3.

So if you are travelling at the correct speed you should arrive at the turn 2:33.3 after you started the 54 km/hr portion of the rally.

Writing that as a single equation we get:

$$Time\ (seconds) = \frac{Distance\ x\ 3600}{Speed}$$

If you are travelling a longer distance before the next turn you could check times at convenient intervals, for example, every km. The time to travel 1km at 54 km/hr is 1:6.6, 2km is twice that, i.e.2:13.3 and so on.

If your rally computer has two odometers, you can reset one of them whenever your speed changes and use a stopwatch to compare your time at each km with your actual time.

## Speed Tables

Speed tables are essentially the above calculations done ahead of time with the results printed into a table.

Speed tables have one page for each speed. That page contains a table of times to distance for that speed. The left column lists distances in increments of 1 km, the top row (column headers) lists distances in increments of 0.1 km. The entries in the table are the time to travel to the distance given by adding the value from column 1 to the value in the column header.

The following page shows the speed table for 54 km/hr. For the example above we want to know how long it takes to travel 2.3km at 54 km/hr. To do that:

1. Look in the left hand column and find the row that is for 2km.
2. Look along that row for the entry in the 0.3km column
3. That entry is the time to travel 2.3km ay 54 km/hr, 2:33.3, the same as we calculated above.

With these tables it is easy to check your time at every km along the route. Reset your stopwatch when the speed changes and as the odometer gets to the next km check your time against the table entry. For 1.0km that is 1:06.7 for 2.0km it is 2:13.3 and so on.

When the average speed changes, reset the stopwatch, jump to the page for that speed and use the numbers there.

There are a set of speed tables available at https://roadrallyatlantic.ca/docs-and-regs/ . Scroll down the page until you find the Speed Tables.

Speed tables are easy to use but they have the limitation of only giving times in 0.1km intervals. Road rally instructions typically give distances to 2 decimal places, i.e. 0.01km resolution. This means that you might need the time to travel 5.64km but the speed tables will give you the times for 5.6km and 5.7km. The speed tables referenced here have additional rows at the bottom of the page that give the times for 0.01km to 0.09km in increments of 0.01km. To determine times to two decimal places look up the time for the last digit in the bottom row and add to the value in the main table. So, for 5.64km at 54 km/hr, look up the time for 5.6km (06:13.3) then look in the bottom row for the time for 0.04km (00:02.7) and add the times to get 06:16.0.

## Note

The speed tables will also work for a rally where distances are in miles and speed in miles/hr. In fact, they are good for any distance unit as long as the speeds are expressed in the same units per hour.

| Speed | | 54 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Dist. | 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
| 0 | | 0:00:06.7 | 0:00:13.3 | 0:00:20.0 | 0:00:26.7 | 0:00:33.3 | 0:00:40.0 | 0:00:46.7 | 0:00:53.3 | 0:01:00.0 |
| 1 | 0:01:06.7 | 0:01:13.3 | 0:01:20.0 | 0:01:26.7 | 0:01:33.3 | 0:01:40.0 | 0:01:46.7 | 0:01:53.3 | 0:02:00.0 | 0:02:06.7 |
| 2 | 0:02:13.3 | 0:02:20.0 | 0:02:26.7 | 0:02:33.3 | 0:02:40.0 | 0:02:46.7 | 0:02:53.3 | 0:03:00.0 | 0:03:06.7 | 0:03:13.3 |
| 3 | 0:03:20.0 | 0:03:26.7 | 0:03:33.3 | 0:03:40.0 | 0:03:46.7 | 0:03:53.3 | 0:04:00.0 | 0:04:06.7 | 0:04:13.3 | 0:04:20.0 |
| 4 | 0:04:26.7 | 0:04:33.3 | 0:04:40.0 | 0:04:46.7 | 0:04:53.3 | 0:05:00.0 | 0:05:06.7 | 0:05:13.3 | 0:05:20.0 | 0:05:26.7 |
| 5 | 0:05:33.3 | 0:05:40.0 | 0:05:46.7 | 0:05:53.3 | 0:06:00.0 | 0:06:06.7 | 0:06:13.3 | 0:06:20.0 | 0:06:26.7 | 0:06:33.3 |
| 6 | 0:06:40.0 | 0:06:46.7 | 0:06:53.3 | 0:07:00.0 | 0:07:06.7 | 0:07:13.3 | 0:07:20.0 | 0:07:26.7 | 0:07:33.3 | 0:07:40.0 |
| 7 | 0:07:46.7 | 0:07:53.3 | 0:08:00.0 | 0:08:06.7 | 0:08:13.3 | 0:08:20.0 | 0:08:26.7 | 0:08:33.3 | 0:08:40.0 | 0:08:46.7 |
| 8 | 0:08:53.3 | 0:09:00.0 | 0:09:06.7 | 0:09:13.3 | 0:09:20.0 | 0:09:26.7 | 0:09:33.3 | 0:09:40.0 | 0:09:46.7 | 0:09:53.3 |
| 9 | 0:10:00.0 | 0:10:06.7 | 0:10:13.3 | 0:10:20.0 | 0:10:26.7 | 0:10:33.3 | 0:10:40.0 | 0:10:46.7 | 0:10:53.3 | 0:11:00.0 |
| 10 | 0:11:06.7 | 0:11:13.3 | 0:11:20.0 | 0:11:26.7 | 0:11:33.3 | 0:11:40.0 | 0:11:46.7 | 0:11:53.3 | 0:12:00.0 | 0:12:06.7 |
| 11 | 0:12:13.3 | 0:12:20.0 | 0:12:26.7 | 0:12:33.3 | 0:12:40.0 | 0:12:46.7 | 0:12:53.3 | 0:13:00.0 | 0:13:06.7 | 0:13:13.3 |
| 12 | 0:13:20.0 | 0:13:26.7 | 0:13:33.3 | 0:13:40.0 | 0:13:46.7 | 0:13:53.3 | 0:14:00.0 | 0:14:06.7 | 0:14:13.3 | 0:14:20.0 |
| 13 | 0:14:26.7 | 0:14:33.3 | 0:14:40.0 | 0:14:46.7 | 0:14:53.3 | 0:15:00.0 | 0:15:06.7 | 0:15:13.3 | 0:15:20.0 | 0:15:26.7 |
| 14 | 0:15:33.3 | 0:15:40.0 | 0:15:46.7 | 0:15:53.3 | 0:16:00.0 | 0:16:06.7 | 0:16:13.3 | 0:16:20.0 | 0:16:26.7 | 0:16:33.3 |
| 15 | 0:16:40.0 | 0:16:46.7 | 0:16:53.3 | 0:17:00.0 | 0:17:06.7 | 0:17:13.3 | 0:17:20.0 | 0:17:26.7 | 0:17:33.3 | 0:17:40.0 |
| 16 | 0:17:46.7 | 0:17:53.3 | 0:18:00.0 | 0:18:06.7 | 0:18:13.3 | 0:18:20.0 | 0:18:26.7 | 0:18:33.3 | 0:18:40.0 | 0:18:46.7 |
| 17 | 0:18:53.3 | 0:19:00.0 | 0:19:06.7 | 0:19:13.3 | 0:19:20.0 | 0:19:26.7 | 0:19:33.3 | 0:19:40.0 | 0:19:46.7 | 0:19:53.3 |
| 18 | 0:20:00.0 | 0:20:06.7 | 0:20:13.3 | 0:20:20.0 | 0:20:26.7 | 0:20:33.3 | 0:20:40.0 | 0:20:46.7 | 0:20:53.3 | 0:21:00.0 |
| 19 | 0:21:06.7 | 0:21:13.3 | 0:21:20.0 | 0:21:26.7 | 0:21:33.3 | 0:21:40.0 | 0:21:46.7 | 0:21:53.3 | 0:22:00.0 | 0:22:06.7 |
| 20 | 0:22:13.3 | 0:22:20.0 | 0:22:26.7 | 0:22:33.3 | 0:22:40.0 | 0:22:46.7 | 0:22:53.3 | 0:23:00.0 | 0:23:06.7 | 0:23:13.3 |
| 21 | 0:23:20.0 | 0:23:26.7 | 0:23:33.3 | 0:23:40.0 | 0:23:46.7 | 0:23:53.3 | 0:24:00.0 | 0:24:06.7 | 0:24:13.3 | 0:24:20.0 |
| 22 | 0:24:26.7 | 0:24:33.3 | 0:24:40.0 | 0:24:46.7 | 0:24:53.3 | 0:25:00.0 | 0:25:06.7 | 0:25:13.3 | 0:25:20.0 | 0:25:26.7 |
| 23 | 0:25:33.3 | 0:25:40.0 | 0:25:46.7 | 0:25:53.3 | 0:26:00.0 | 0:26:06.7 | 0:26:13.3 | 0:26:20.0 | 0:26:26.7 | 0:26:33.3 |
| 24 | 0:26:40.0 | 0:26:46.7 | 0:26:53.3 | 0:27:00.0 | 0:27:06.7 | 0:27:13.3 | 0:27:20.0 | 0:27:26.7 | 0:27:33.3 | 0:27:40.0 |
| 25 | 0:27:46.7 | 0:27:53.3 | 0:28:00.0 | 0:28:06.7 | 0:28:13.3 | 0:28:20.0 | 0:28:26.7 | 0:28:33.3 | 0:28:40.0 | 0:28:46.7 |
| 26 | 0:28:53.3 | 0:29:00.0 | 0:29:06.7 | 0:29:13.3 | 0:29:20.0 | 0:29:26.7 | 0:29:33.3 | 0:29:40.0 | 0:29:46.7 | 0:29:53.3 |
| 27 | 0:30:00.0 | 0:30:06.7 | 0:30:13.3 | 0:30:20.0 | 0:30:26.7 | 0:30:33.3 | 0:30:40.0 | 0:30:46.7 | 0:30:53.3 | 0:31:00.0 |
| 28 | 0:31:06.7 | 0:31:13.3 | 0:31:20.0 | 0:31:26.7 | 0:31:33.3 | 0:31:40.0 | 0:31:46.7 | 0:31:53.3 | 0:32:00.0 | 0:32:06.7 |
| 29 | 0:32:13.3 | 0:32:20.0 | 0:32:26.7 | 0:32:33.3 | 0:32:40.0 | 0:32:46.7 | 0:32:53.3 | 0:33:00.0 | 0:33:06.7 | 0:33:13.3 |
| 30 | 0:33:20.0 | 0:33:26.7 | 0:33:33.3 | 0:33:40.0 | 0:33:46.7 | 0:33:53.3 | 0:34:00.0 | 0:34:06.7 | 0:34:13.3 | 0:34:20.0 |
| 31 | 0:34:26.7 | 0:34:33.3 | 0:34:40.0 | 0:34:46.7 | 0:34:53.3 | 0:35:00.0 | 0:35:06.7 | 0:35:13.3 | 0:35:20.0 | 0:35:26.7 |
| 32 | 0:35:33.3 | 0:35:40.0 | 0:35:46.7 | 0:35:53.3 | 0:36:00.0 | 0:36:06.7 | 0:36:13.3 | 0:36:20.0 | 0:36:26.7 | 0:36:33.3 |
| 33 | 0:36:40.0 | 0:36:46.7 | 0:36:53.3 | 0:37:00.0 | 0:37:06.7 | 0:37:13.3 | 0:37:20.0 | 0:37:26.7 | 0:37:33.3 | 0:37:40.0 |
| 34 | 0:37:46.7 | 0:37:53.3 | 0:38:00.0 | 0:38:06.7 | 0:38:13.3 | 0:38:20.0 | 0:38:26.7 | 0:38:33.3 | 0:38:40.0 | 0:38:46.7 |
| 35 | 0:38:53.3 | 0:39:00.0 | 0:39:06.7 | 0:39:13.3 | 0:39:20.0 | 0:39:26.7 | 0:39:33.3 | 0:39:40.0 | 0:39:46.7 | 0:39:53.3 |
| 36 | 0:40:00.0 | 0:40:06.7 | 0:40:13.3 | 0:40:20.0 | 0:40:26.7 | 0:40:33.3 | 0:40:40.0 | 0:40:46.7 | 0:40:53.3 | 0:41:00.0 |
| 37 | 0:41:06.7 | 0:41:13.3 | 0:41:20.0 | 0:41:26.7 | 0:41:33.3 | 0:41:40.0 | 0:41:46.7 | 0:41:53.3 | 0:42:00.0 | 0:42:06.7 |
| 38 | 0:42:13.3 | 0:42:20.0 | 0:42:26.7 | 0:42:33.3 | 0:42:40.0 | 0:42:46.7 | 0:42:53.3 | 0:43:00.0 | 0:43:06.7 | 0:43:13.3 |
| 39 | 0:43:20.0 | 0:43:26.7 | 0:43:33.3 | 0:43:40.0 | 0:43:46.7 | 0:43:53.3 | 0:44:00.0 | 0:44:06.7 | 0:44:13.3 | 0:44:20.0 |
| 40 | 0:44:26.7 | 0:44:33.3 | 0:44:40.0 | 0:44:46.7 | 0:44:53.3 | 0:45:00.0 | 0:45:06.7 | 0:45:13.3 | 0:45:20.0 | 0:45:26.7 |
| | | | | | | | | | | |
| | 0 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
| 0 | | 0:00:00.7 | 0:00:01.3 | 0:00:02.0 | 0:00:02.7 | 0:00:03.3 | 0:00:04.0 | 0:00:04.7 | 0:00:05.3 | 0:00:06.0 |