Expanding Square Search Pattern

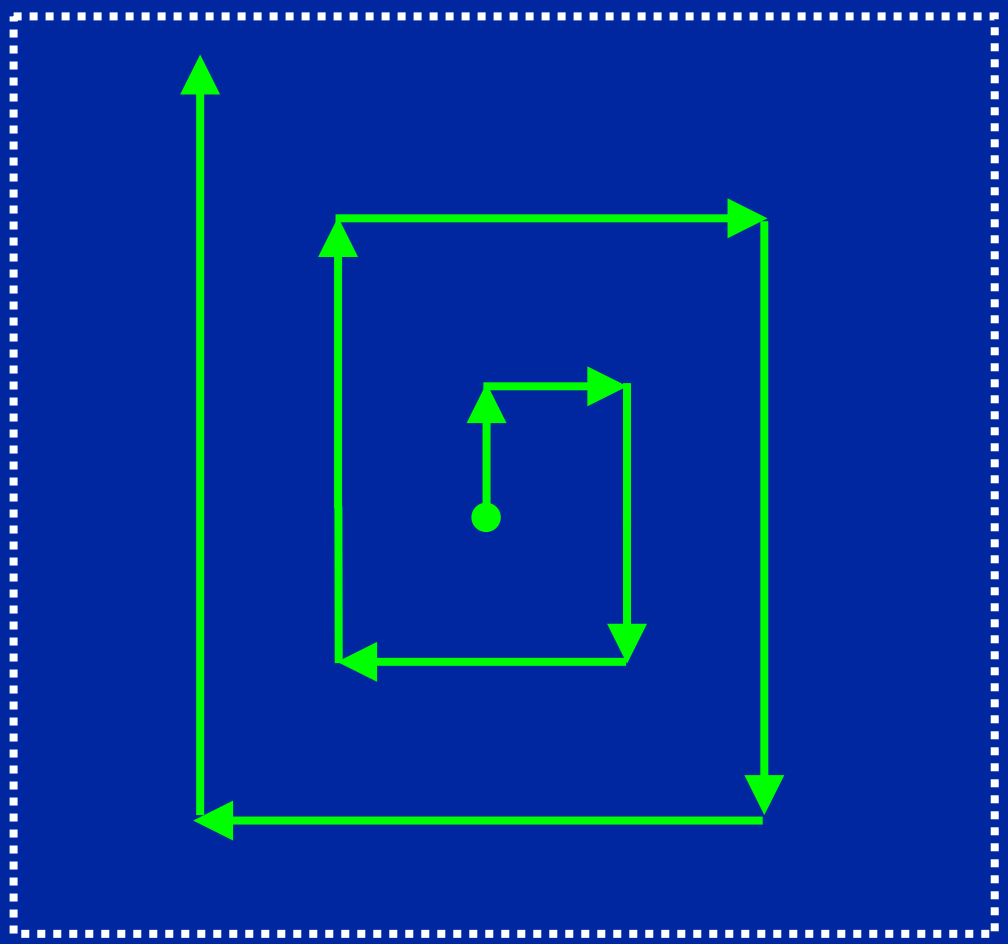
Expanding Square Search

Characteristics:

- Used in relatively small search areas
- There is a good starting point
- Provides uniform coverage

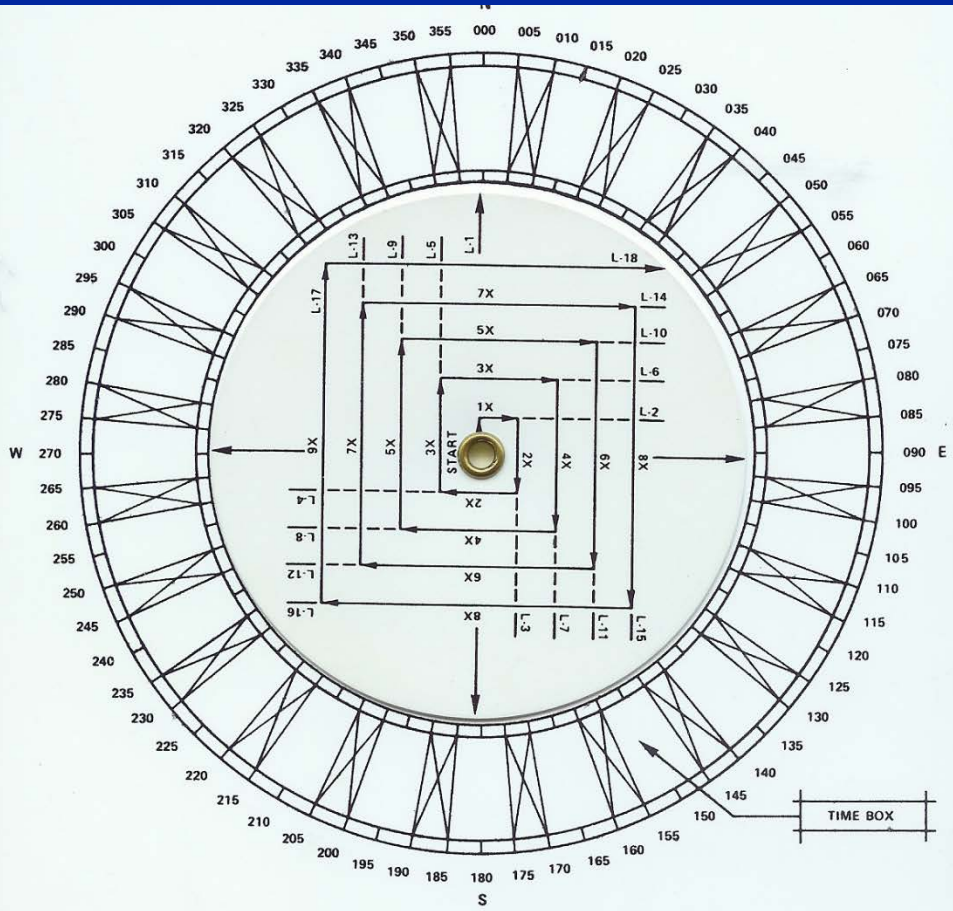
Expanding Square Search

Search Pattern



Search Area

How do we do that ????



COURSE AND LEG IDENTIFIER FOR EXPANDING SQUARE PATTERN – (SS)

TIME AND DISTANCE TABLE

SPEED

NAUTICAL MILES	5Kts	8Kts	10Kts	12Kts	15Kts	18Kts	20Kts
	M:S	M:S	M:S	M:S	M:S	M:S	M:S
.5	6:00	3:45	3:00	2:30	2:00	1:40	1:30
1	12:00	7:30	6:00	5:00	4:00	3:20	3:00
1.5	18:00	11:15	9:00	7:30	6:00	5:00	4:30
2	24:00	15:00	12:00	10:00	8:00	6:40	6:00
2.5	30:00	18:45	15:00	12:30	10:00	8:20	7:30
3	36:00	22:30	18:00	15:00	12:00	10:00	9:00
3.5	42:00	26:15	21:00	17:30	14:00	11:40	10:30
4	48:00	30:00	24:00	20:00	16:00	13:20	12:00
4.5	54:00	33:45	27:00	22:30	18:00	15:00	13:30
5	60:00	37:30	30:00	25:00	20:00	16:40	15:00
5.5		41:15	33:00	27:30	22:00	18:20	16:30
6		45:00	36:00	30:00	24:00	20:00	18:00
6.5		48:45	39:00	32:30	26:00	21:40	19:30
7		52:30	42:00	35:00	28:00	23:20	21:00
7.5		56:15	45:00	37:30	30:00	25:00	22:30
8			48:00	40:00	32:00	26:40	24:00

M = MINUTES
S = SECONDS

1. PLACE INDEX (ARROW NUMBER 1) ON HEADING OF FIRST SEARCH LEG. HEADINGS OF ALL LEGS ARE SHOWN BY THE CORRESPONDING PARALLEL INDEX ARROWS.

2. RECORD TIME TO TURN IN THE TIME BOX FOR EACH LEG. LEG NUMBERS ARE SHOWN ON LEG EXTENSION LINES.

We use our:

Expanding Square Search Pattern

Plotting Aid

Expanding Square Search

Execution:

- **Commence Search Point is at datum (provided by SAR Mission Coordinator)**
- **First leg is down drift**
- **All turns are 90 degrees to the right**
- **Search leg length is increased by one track space on every other leg.**

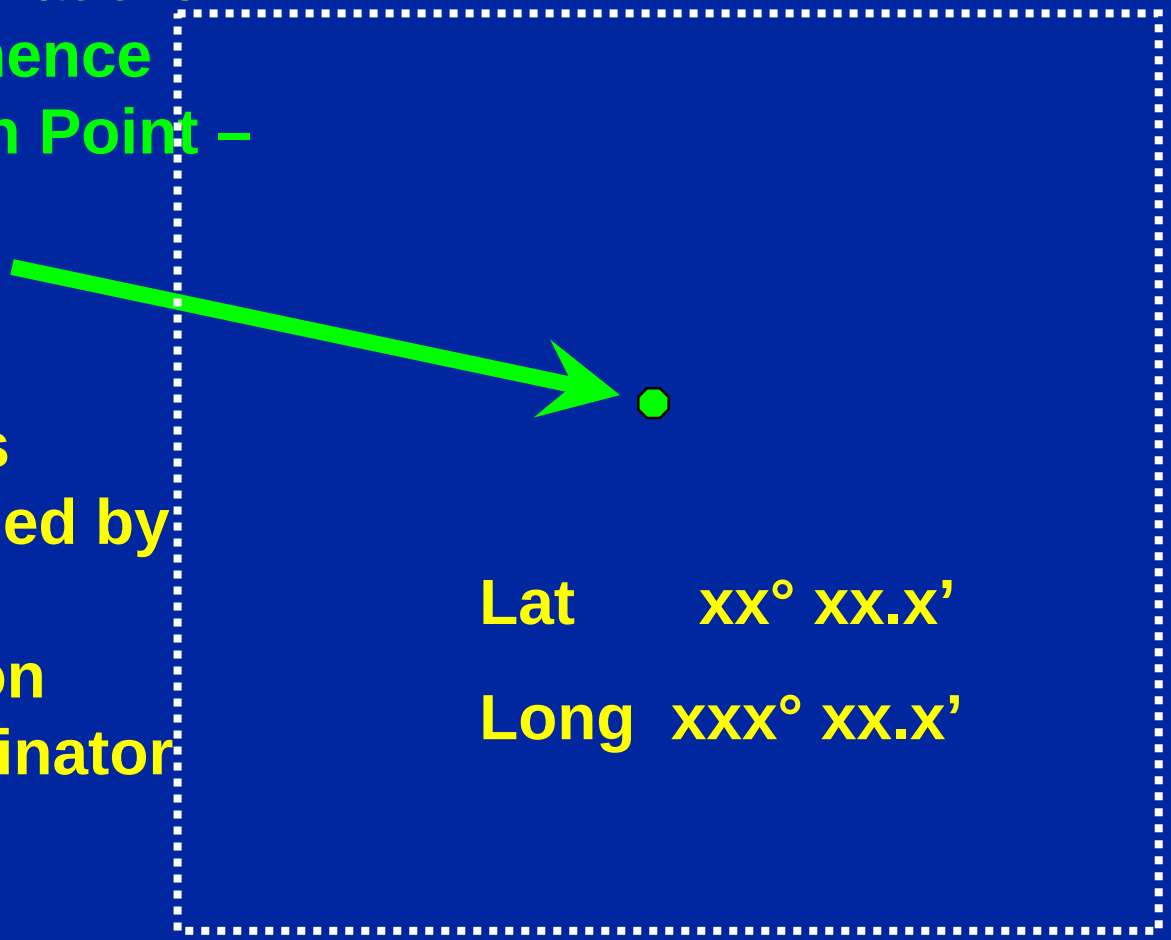
Expanding Square Search

The Search and Rescue Mission Coordinator (SMC) provides:

- **Commence Search Point (CSP)**
  - **Where you begin**
  - **Lat and Lon**

Expanding Square Search

- **Begin your search at the Commence Search Point – CSP**
- **This is provided by SAR Mission Coordinator (SMC)**



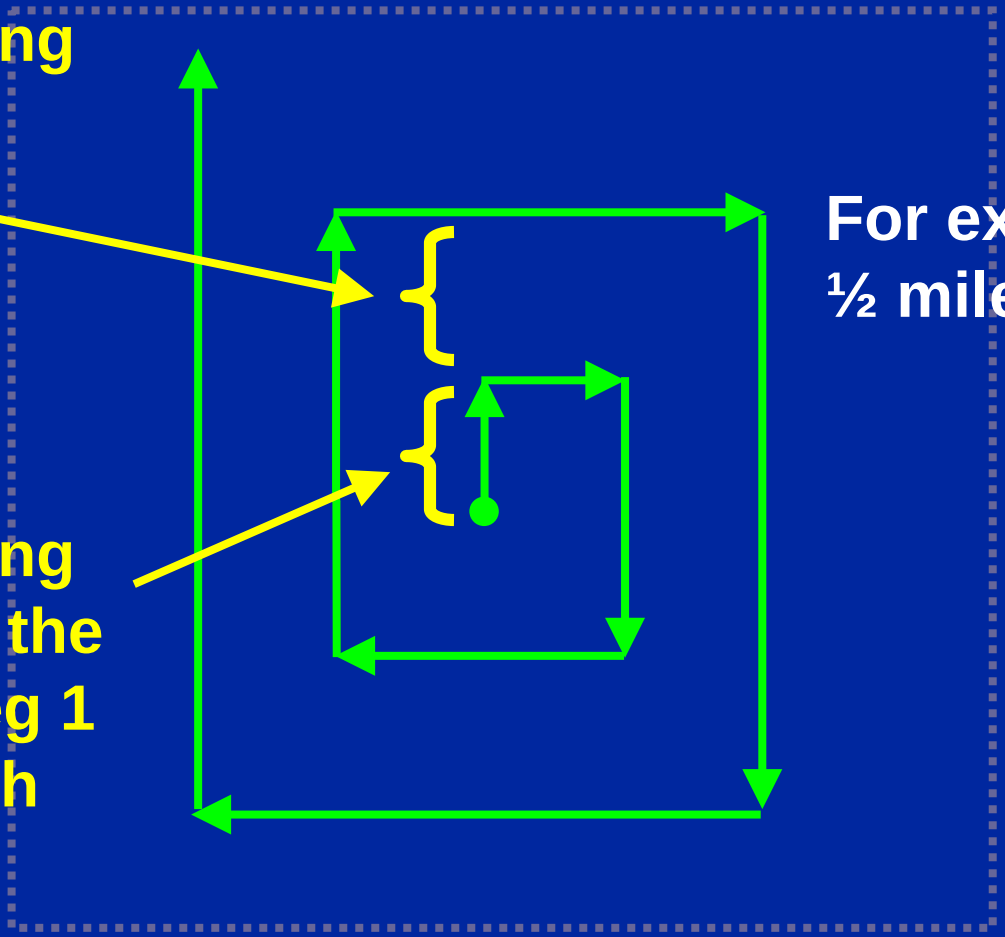
Expanding Square Search

SMC also provides:

- **Track Spacing (separation)**
  - **This will be the distance between parallel search tracks**
  - **This also happens to be the length of the first leg of the search**

Expanding Square Search

- **The SMC provides Track Spacing**



For example: ½ mile

- **Track Spacing also equals the length of Leg 1 of the search**

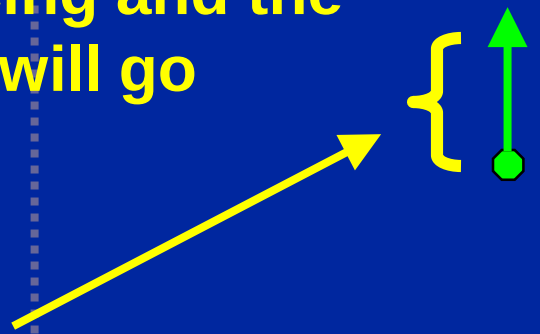
Expanding Square Search

To begin your search you need to:

- **Determine the constant speed at which you will run your vessel during the search**
- **Calculate the time to run the first leg of your search based on this constant speed**

Expanding Square Search

- **Using your search plotting aid, calculate the time for running the first leg based on the distance of the Track Spacing and the speed you will go**



½ mile

For example:

If I run the search at 5 knots, how much time must I run to go ½ mile?

You can use your plotting aid to get the answer

Speed is how fast your boat will run during the search

TIME AND DISTANCE TABLE

SPEED

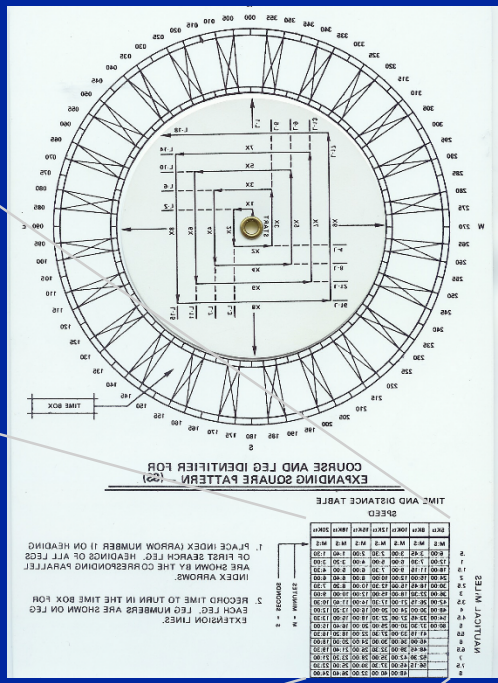
NAUTICAL MILES	5Kts	8Kts	10Kts	12Kts	15Kts	18Kts	20Kts
	M:S	M:S	M:S	M:S	M:S	M:S	M:S
.5	6:00	[illegible]	3:00	2:30	2:00	1:40	1:30
1	12:00	7:30	[illegible]	5:00	4:00	3:20	3:00
1.5	18:00	11:15	9:00	[illegible]	6:00	5:00	4:30
2	24:00	15:00	12:00	10:00	[illegible]	6:40	6:00
2.5	30:00	18:45	15:00	12:30	10:00	[illegible]	7:30
3	36:00	22:30	18:00	15:00	12:00	10:00	[illegible]
3.5	42:00	26:15	21:00	17:30	14:00	11:40	10:30
4	48:00	30:00	24:00	20:00	16:00	13:20	12:00
4.5	54:00	33:45	27:00	22:30	18:00	15:00	13:30
5	60:00	37:30	30:00	25:00	20:00	16:40	15:00
5.5		41:15	33:00	27:30	22:00	18:20	16:30
6		45:00	36:00	30:00	24:00	20:00	18:00
6.5		48:45	39:00	32:30	26:00	21:40	19:30
7		52:30	42:00	35:00	28:00	23:20	21:00
7.5		56:15	45:00	37:30	30:00	25:00	22:30
8			48:00	40:00	32:00	26:40	24:00
	M:S	M:S	M:S	M:S	M:S	M:S	M:S

M = MINUTES

S = SECONDS

1

2



The intersection indicates how many minutes you will run the first search leg.

In our example this is 6 minutes.

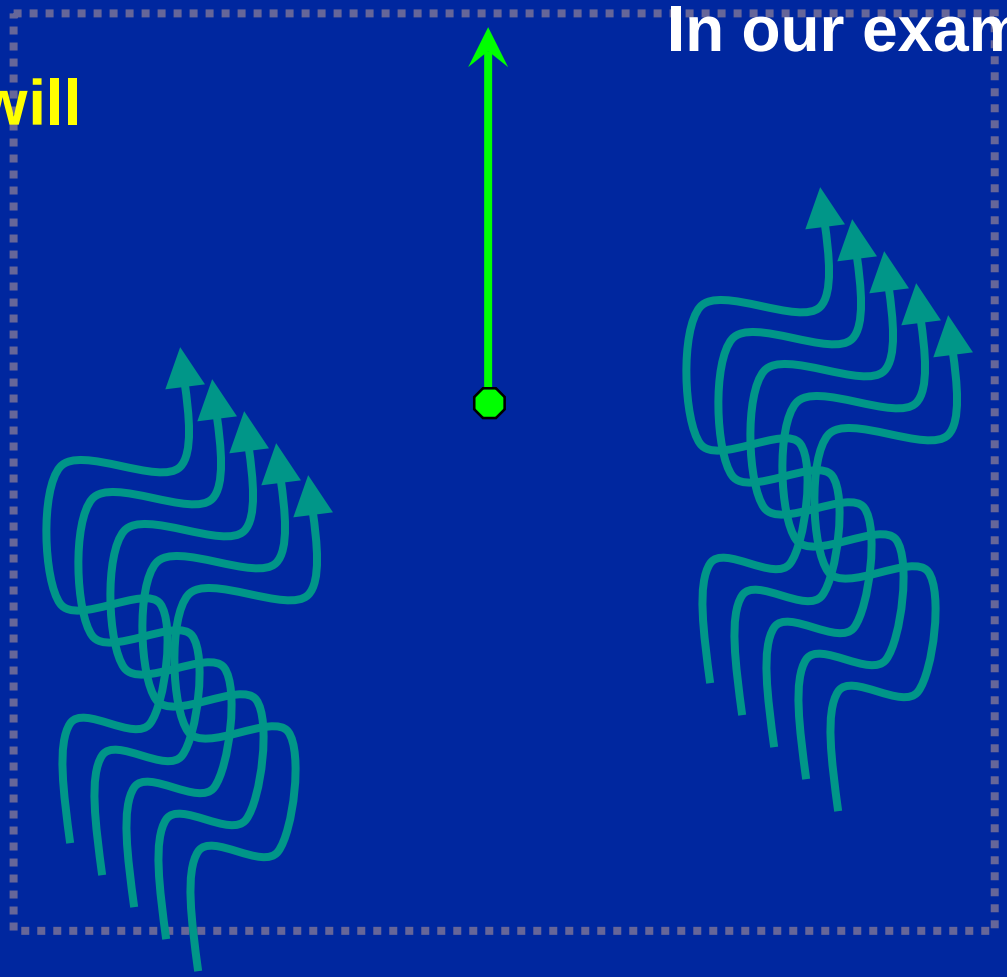
Nautical Miles is the Track Spacing given by the SMC

Expanding Square Search

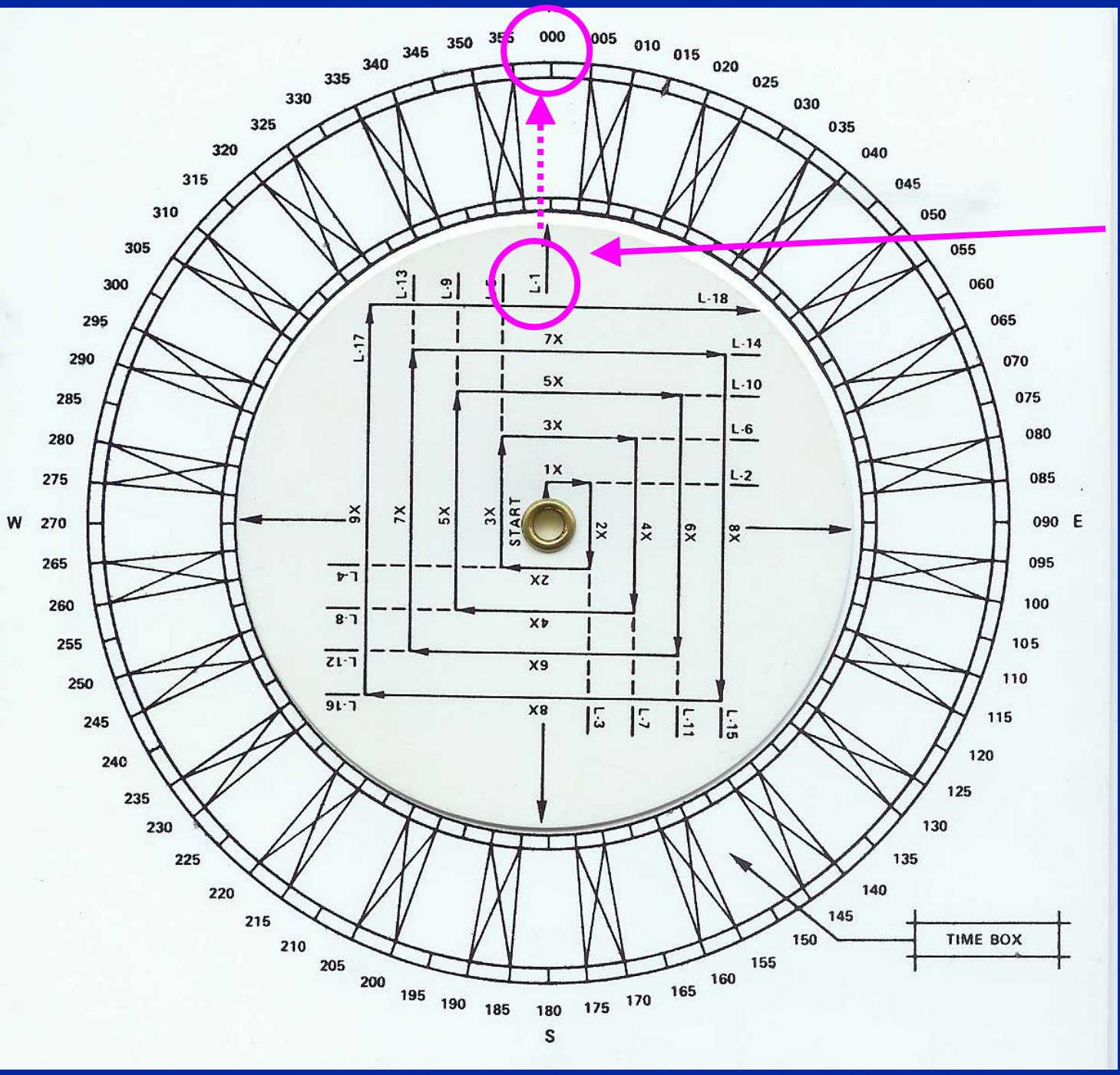
- **You will need to remember (write down) the time you calculated to run the first leg**
  - **We will call the value of the initial leg run time by the name "X"**
  - **The value of X will be used in conjunction with your plotting aid to determine the length of time to run all future legs of the search**
- **In our example, X is 6 minutes**

Expanding Square Search

- **The heading of your initial search leg will be with the current**



In our example: 000°



Rotate the dial on your plotter until the arrow for LEG 1 is pointing to the heading that the current is flowing

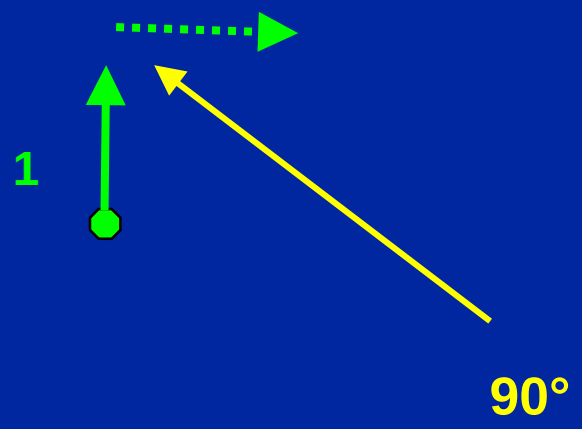
This will be your initial heading

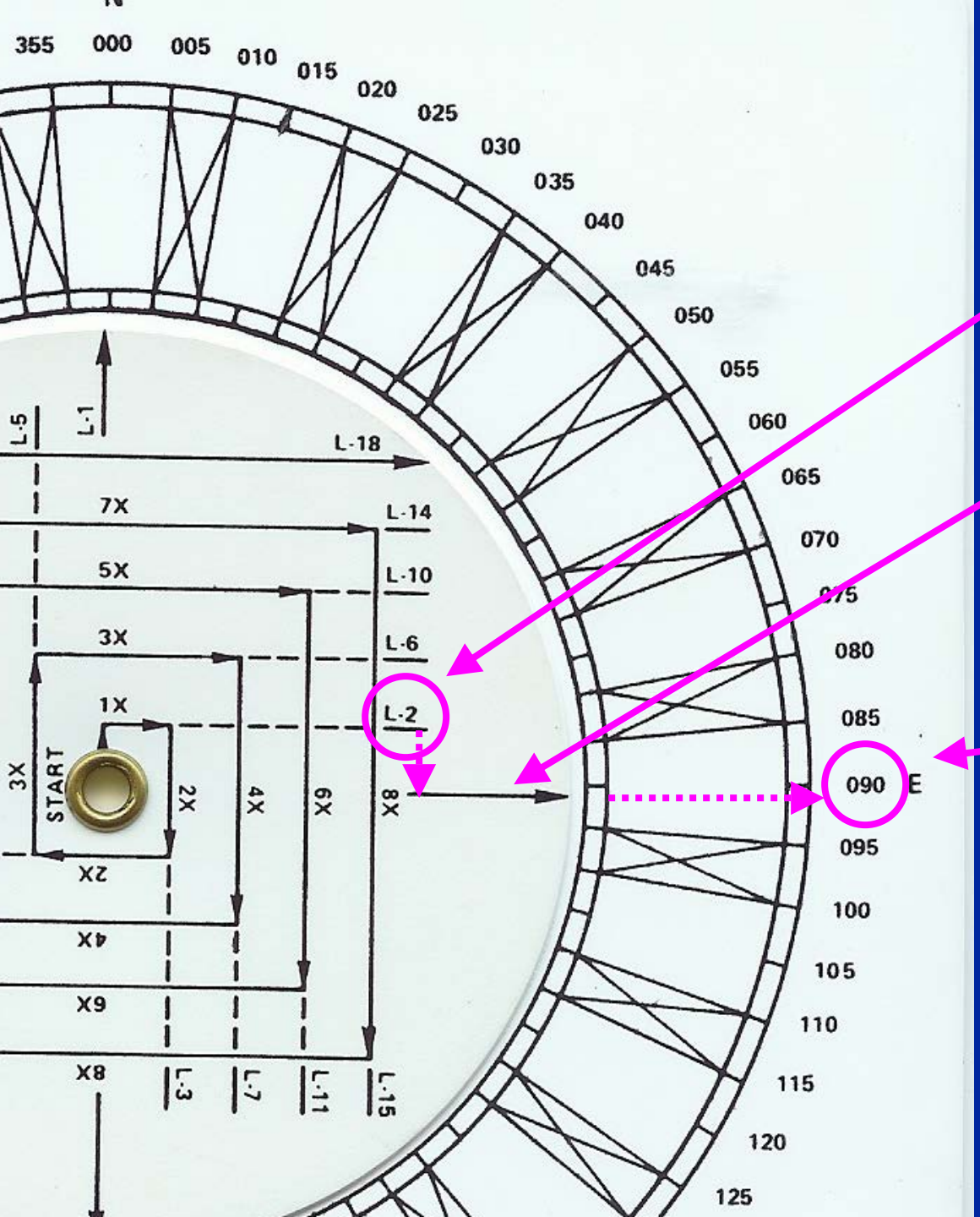
In our example this is 000°

Expanding Square Search

- **Run the first leg of your search for the initial time and at the speed you calculated**
- **At the end of your calculated time, turn right 90 ° (all turns are 90° to the right)**
- **Use your plotting aid to find your new heading and the time to run for this next leg**

In our example, 6 minutes at 5 knots heading 000°



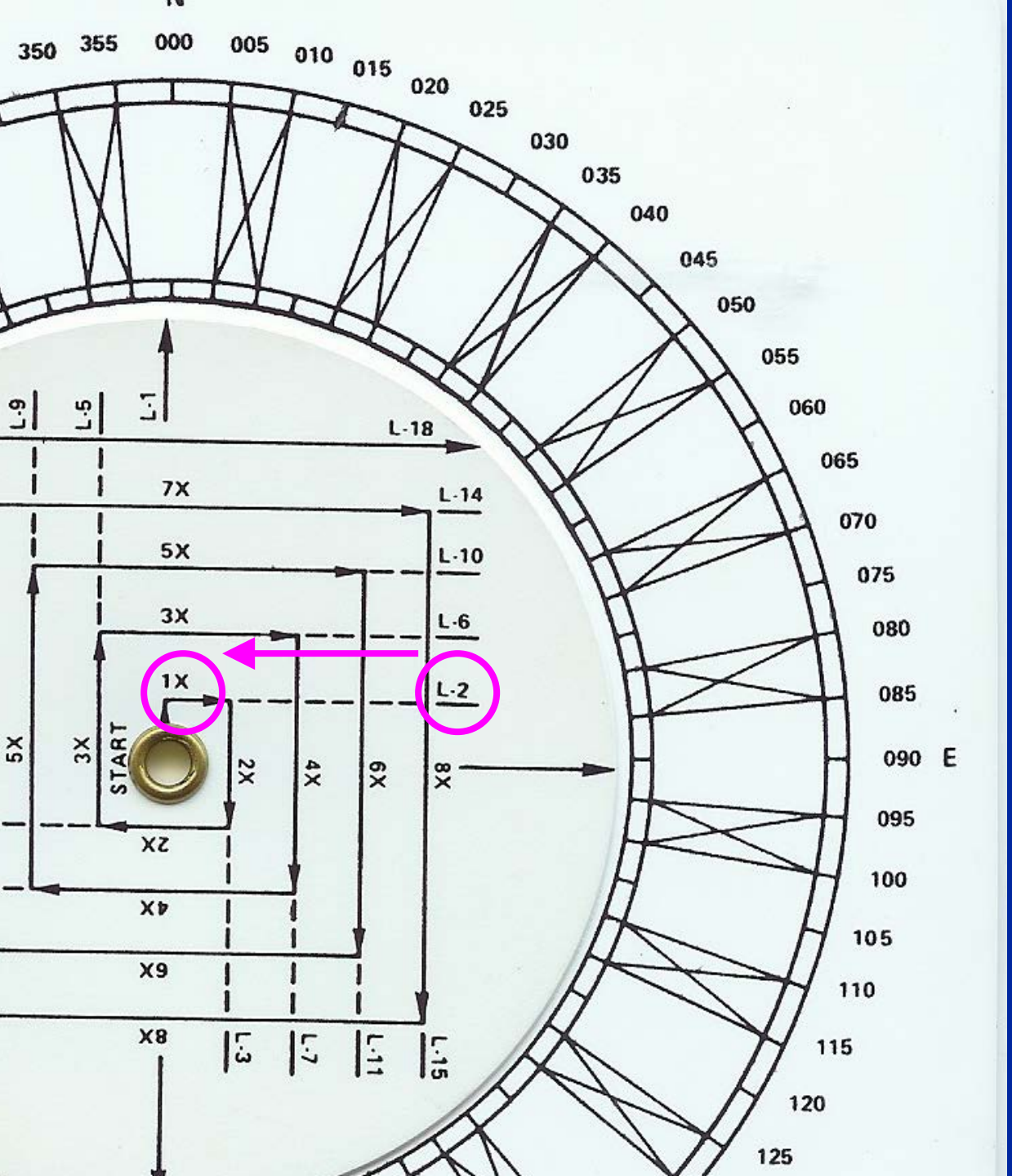


The heading you should follow on the next leg is found by taking the number of the leg you will be on; in this case Leg 2

And carrying it down to the parallel line that passes through the center of the dial

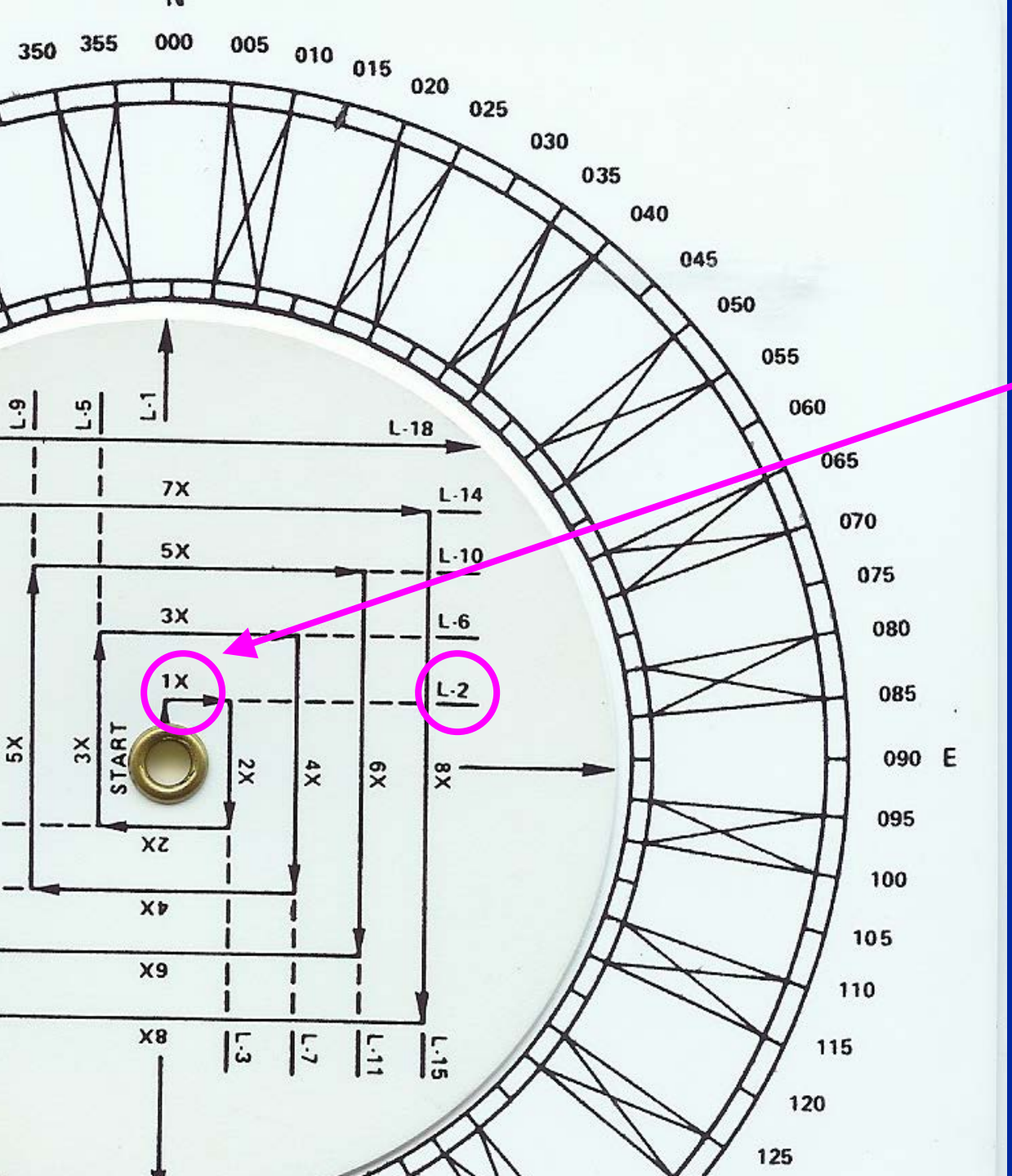
Follow this line out to the edge of the dial to get your course heading

In our example, the heading for Leg 2 is 90 °



The time you should stay on this new heading must be calculated by multiplying X (Leg 1 run time) times a multiplier shown on the plotter

Follow the line on the plotter for the new leg (in this case Leg 2) back toward the center of the dial until you see a number in front of the letter X



This is the number you multiply times your value for X to determine the length of the run time for this leg

In the case of Leg 2, the number in front of X is 1. So the run time for Leg 2 = 1 * X

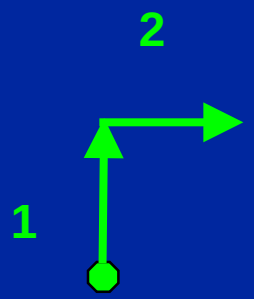
In our example the run time for Leg 2 is :

1 * 6 minutes = 6 minutes

Expanding Square Search

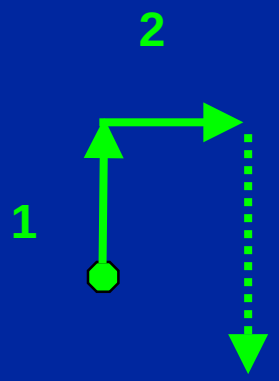
- **Run Leg 2 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**

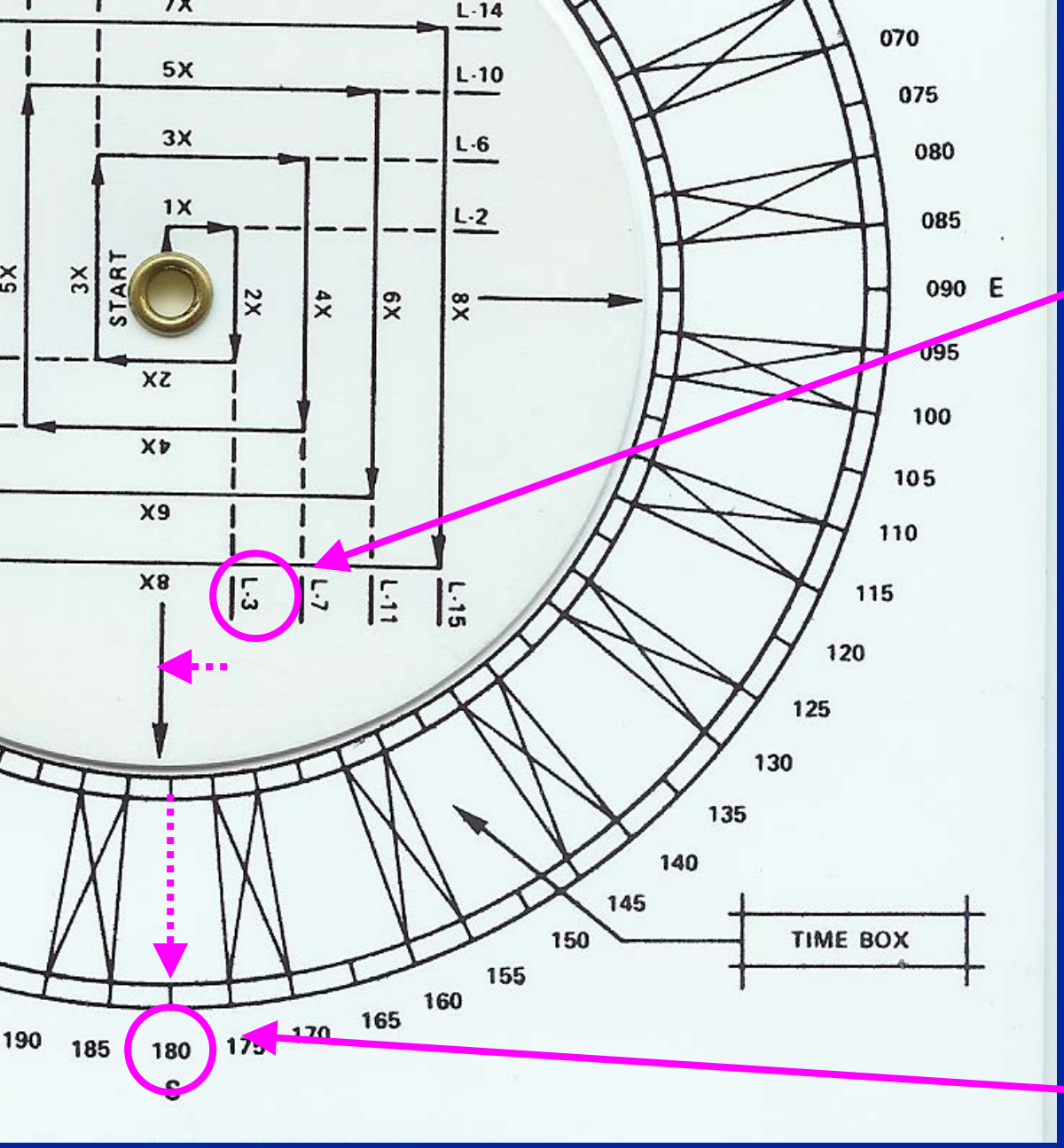
In our example, 6 minutes at 5 knots heading 090°



Expanding Square Search

- **Run Leg 2 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**
- **At the end of your calculated time, turn right 90 °**
- **Use your plotting aid to find your new heading and time to run for this next leg**



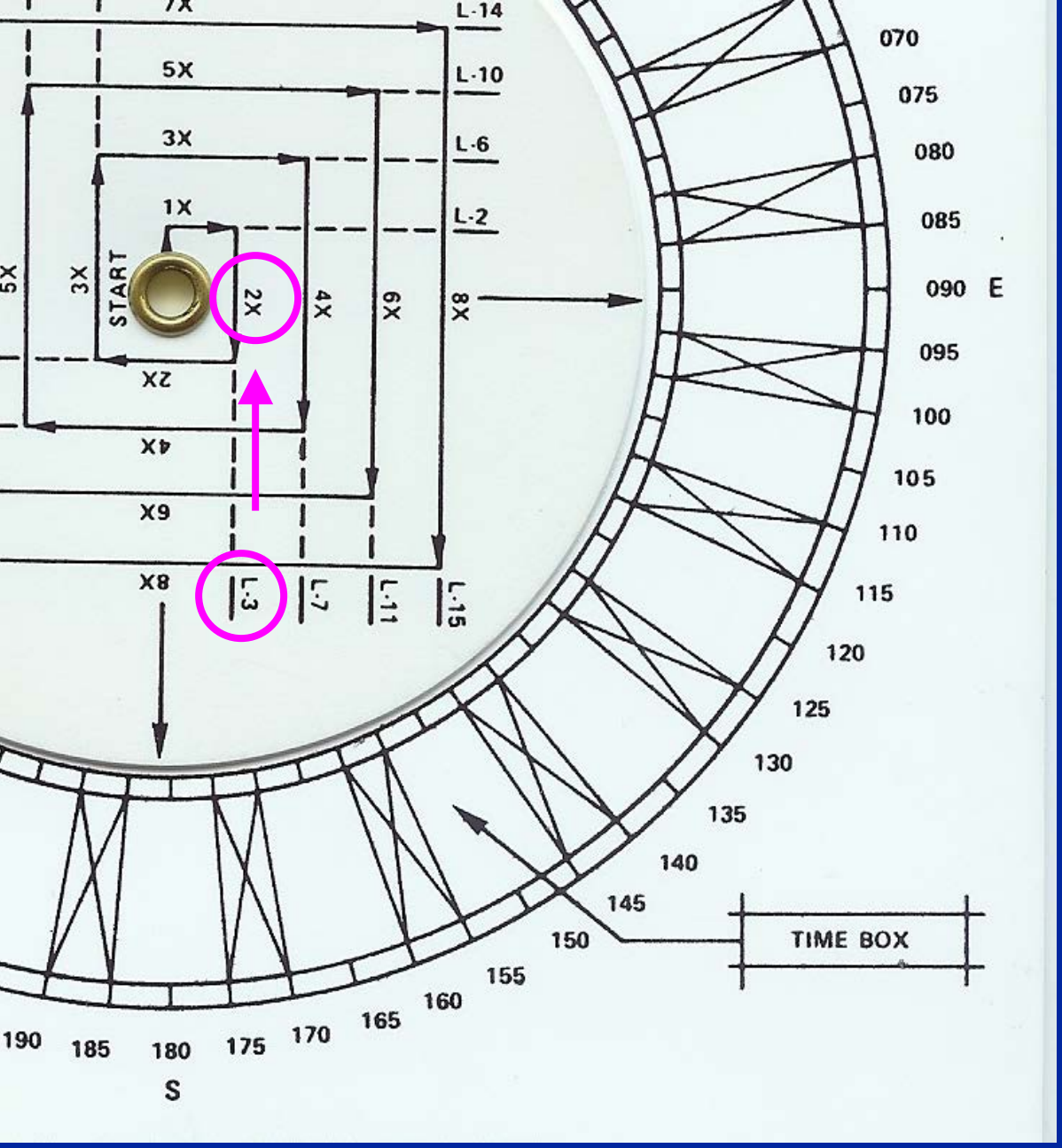


The heading you should follow on the next leg is found by taking the number of the leg you will be on; in this case Leg 3

And carrying it across to the parallel line that passes through the center of the dial

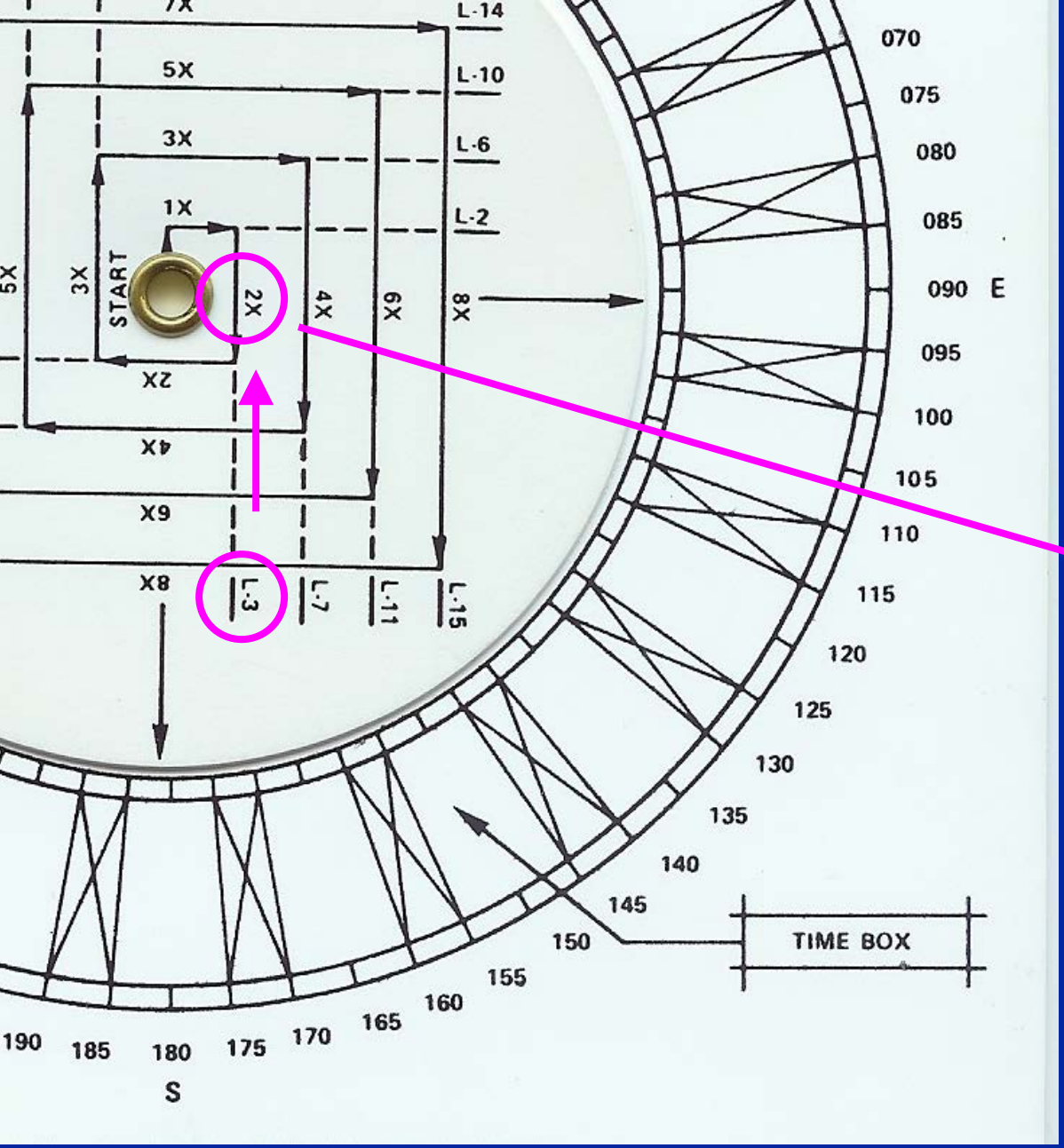
Follow this line out to the edge of the dial to get your course heading

In our example, the heading for Leg 3 is 180 °



The time you should stay on this new heading must be calculated by multiplying X (Leg 1 run time) times the multiplier shown on the plotter

Follow the line on the plotter for the new leg (in this case Leg 3) back toward the center of the dial until you see a number in front of the letter X



This is the number you multiply times your value for X to determine the length of the run time for this leg

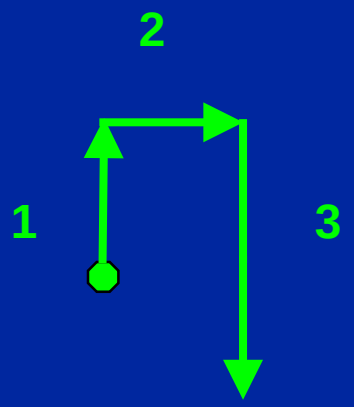
In the case of Leg 3, the number in front of X is 2. So the run time for Leg 3 = 2 * X

In our example the run time for Leg 3 is :

2 * 6 minutes = 12 minutes

Expanding Square Search

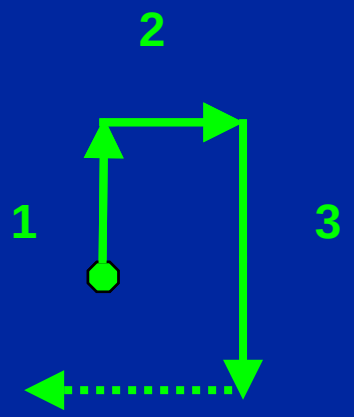
- **Run Leg 3 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**

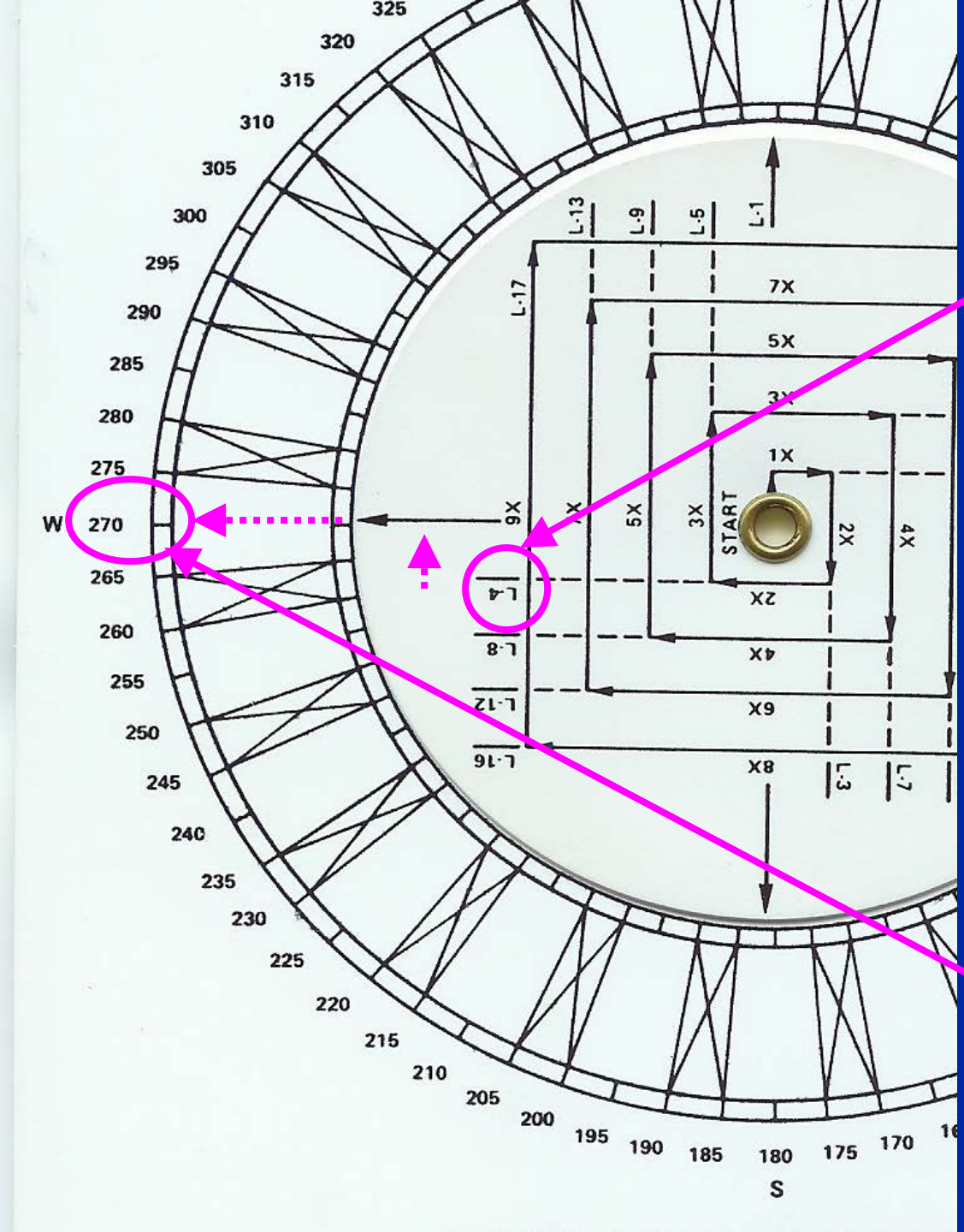


In our example, 12 minutes at 5 knots heading 180°

Expanding Square Search

- **Run Leg 3 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**
- **At the end of your calculated time, turn right 90 °**
- **Use your plotting aid to find your new heading and time to run for this next leg**



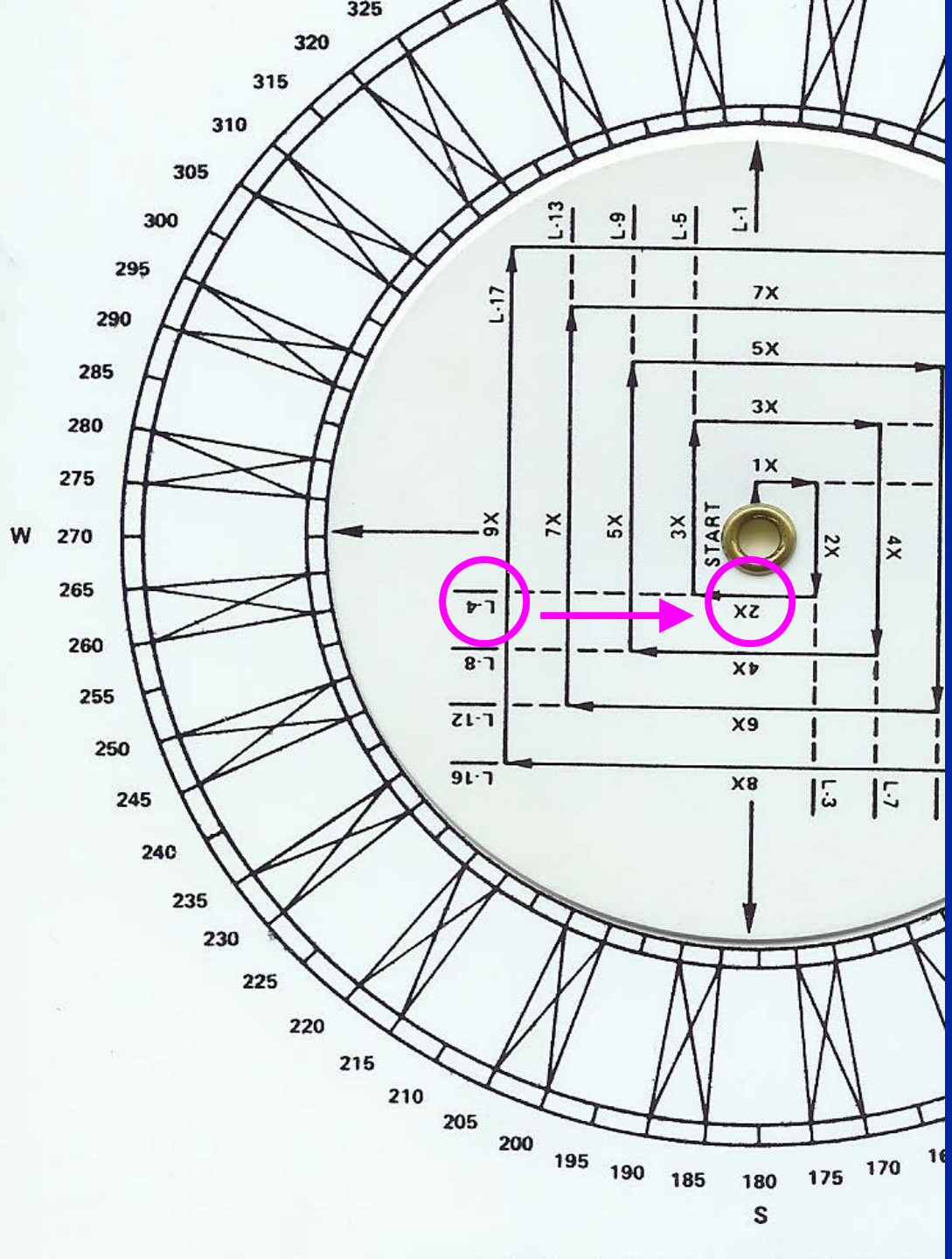


The heading you should follow on the next leg is found by taking the number of the leg you will be on; in this case Leg 4

And carrying it to the parallel line that passes through the center of the dial

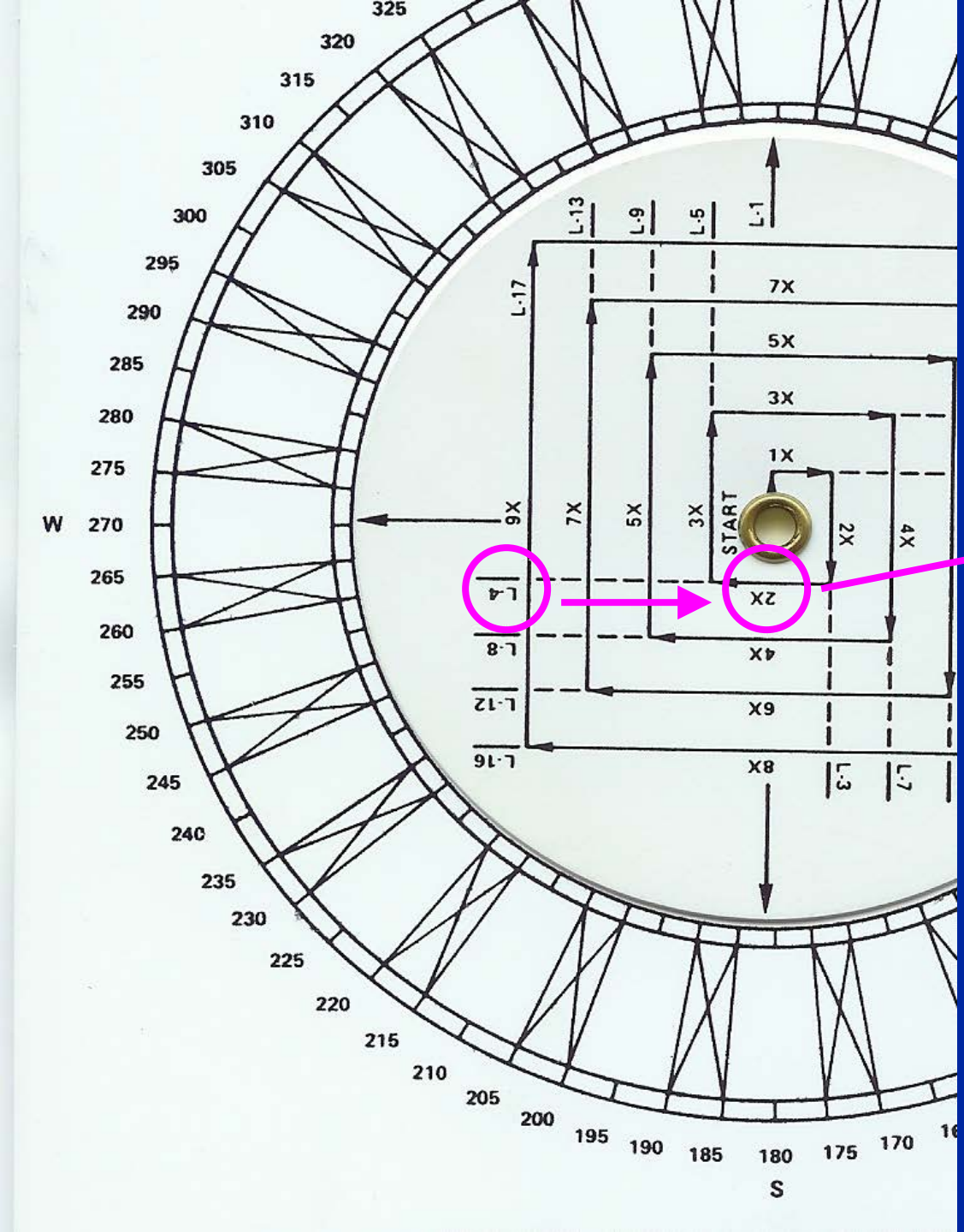
Follow this line out to the edge of the dial to get your course heading

In our example, the heading for Leg 4 is 270 °



The time you should stay on this new heading must be calculated by multiplying X times the multiplier shown on the plotter

Follow the line on the plotter for the new leg (in this case Leg 4) back toward the center of the dial until you see a number in front of the letter X



This is the number you multiply times your value for X to determine the length of the run time for this leg

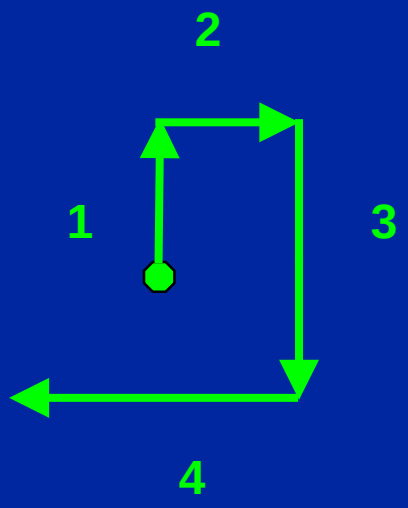
In the case of Leg 4, the number in front of X is 2. So the run time for Leg 4 = 2 * X

In our example the run time for Leg 4 is :

2 * 6 minutes = 12 minutes

Expanding Square Search

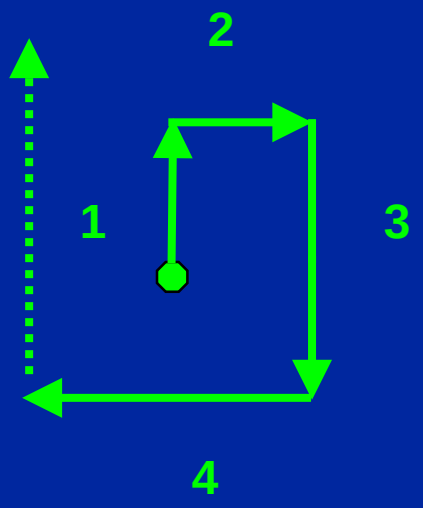
- **Run Leg 4 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**

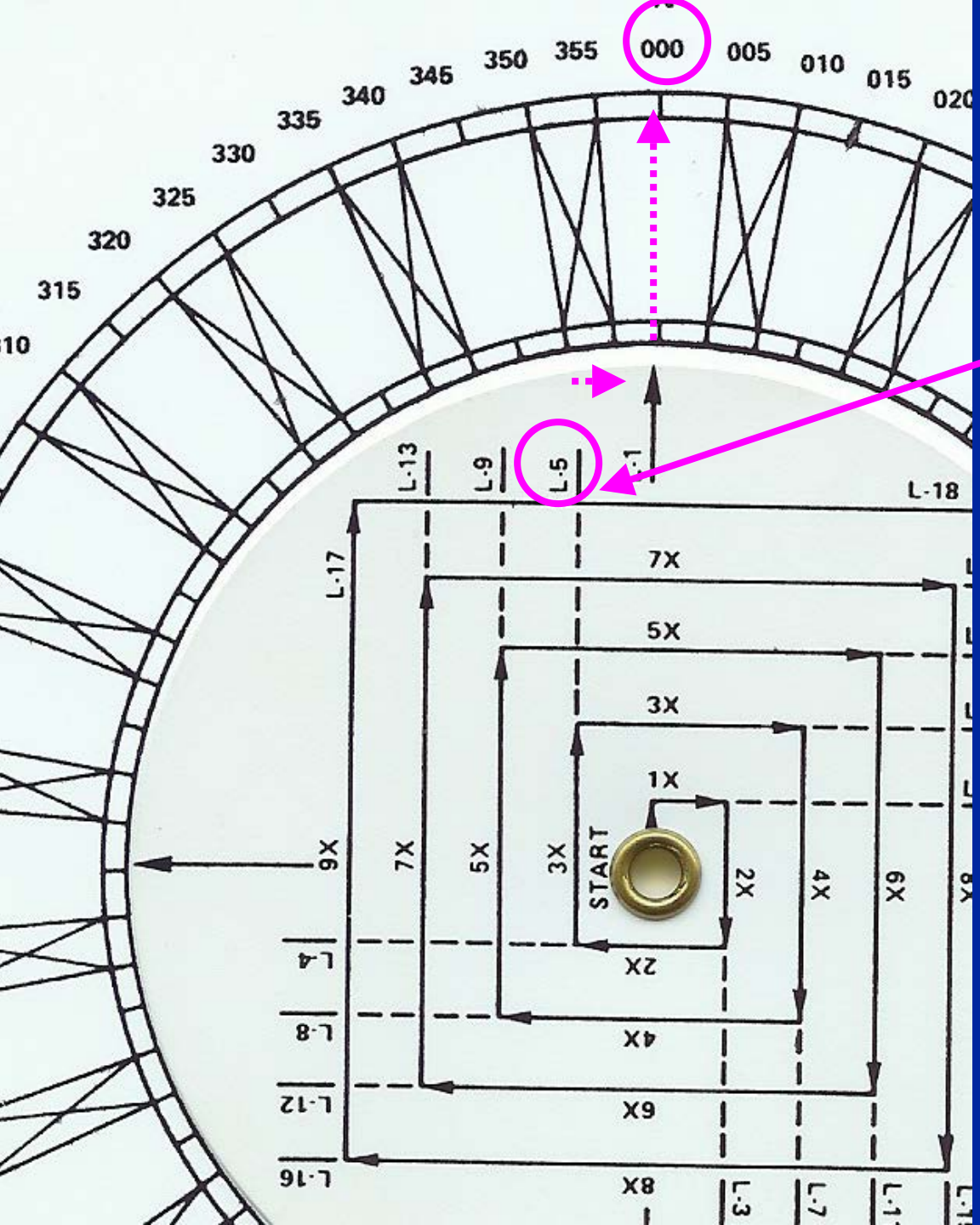


In our example, 12 minutes at 5 knots heading 270°

Expanding Square Search

- **Run Leg 4 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**
- **At the end of your calculated time, turn right 90 °**
- **Use your plotting aid to find your new heading and time to run for this next leg**



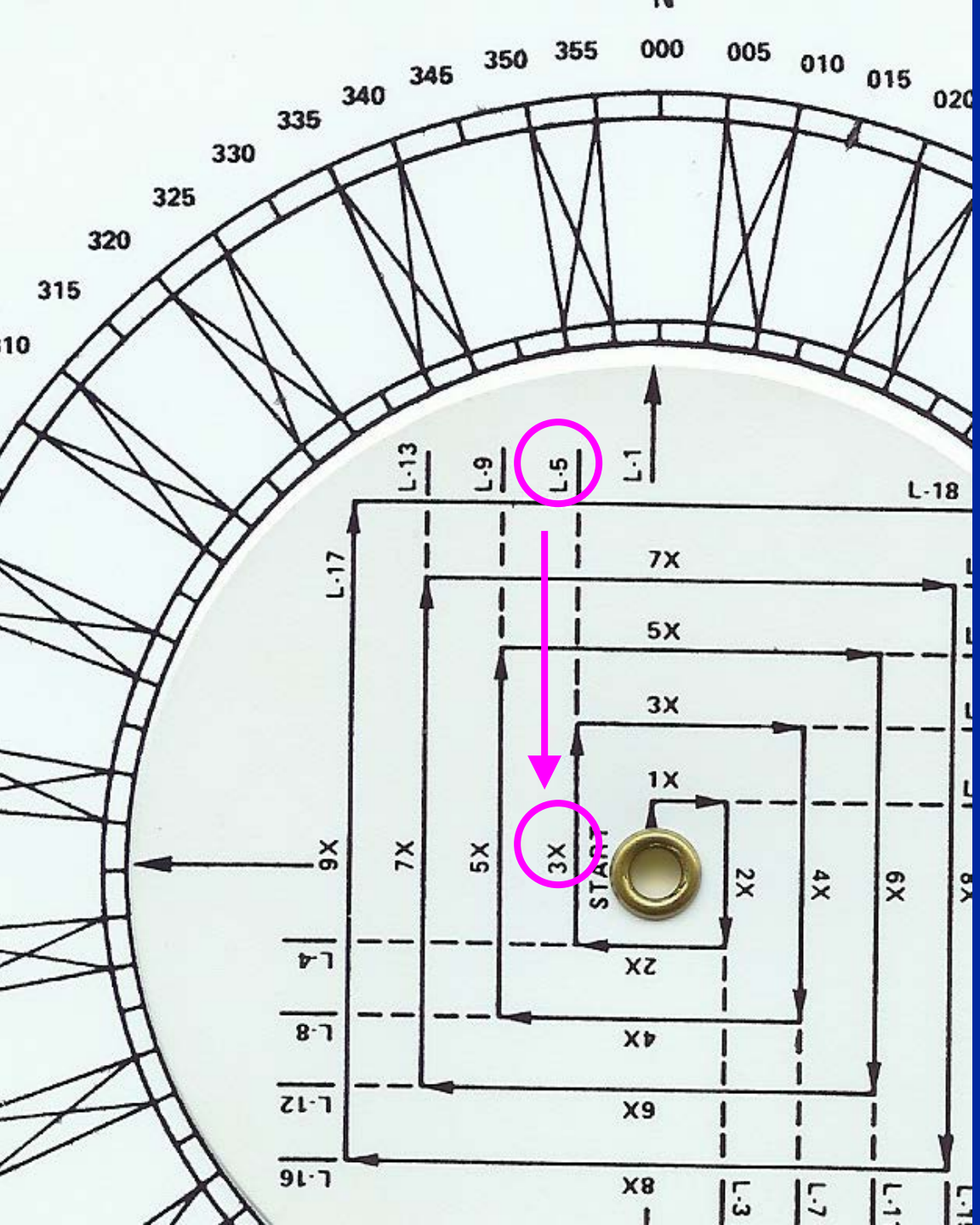


The heading you should follow on the next leg is found by taking the number of the leg you will be on; in this case Leg 5

And carrying it to the parallel line that passes through the center of the dial

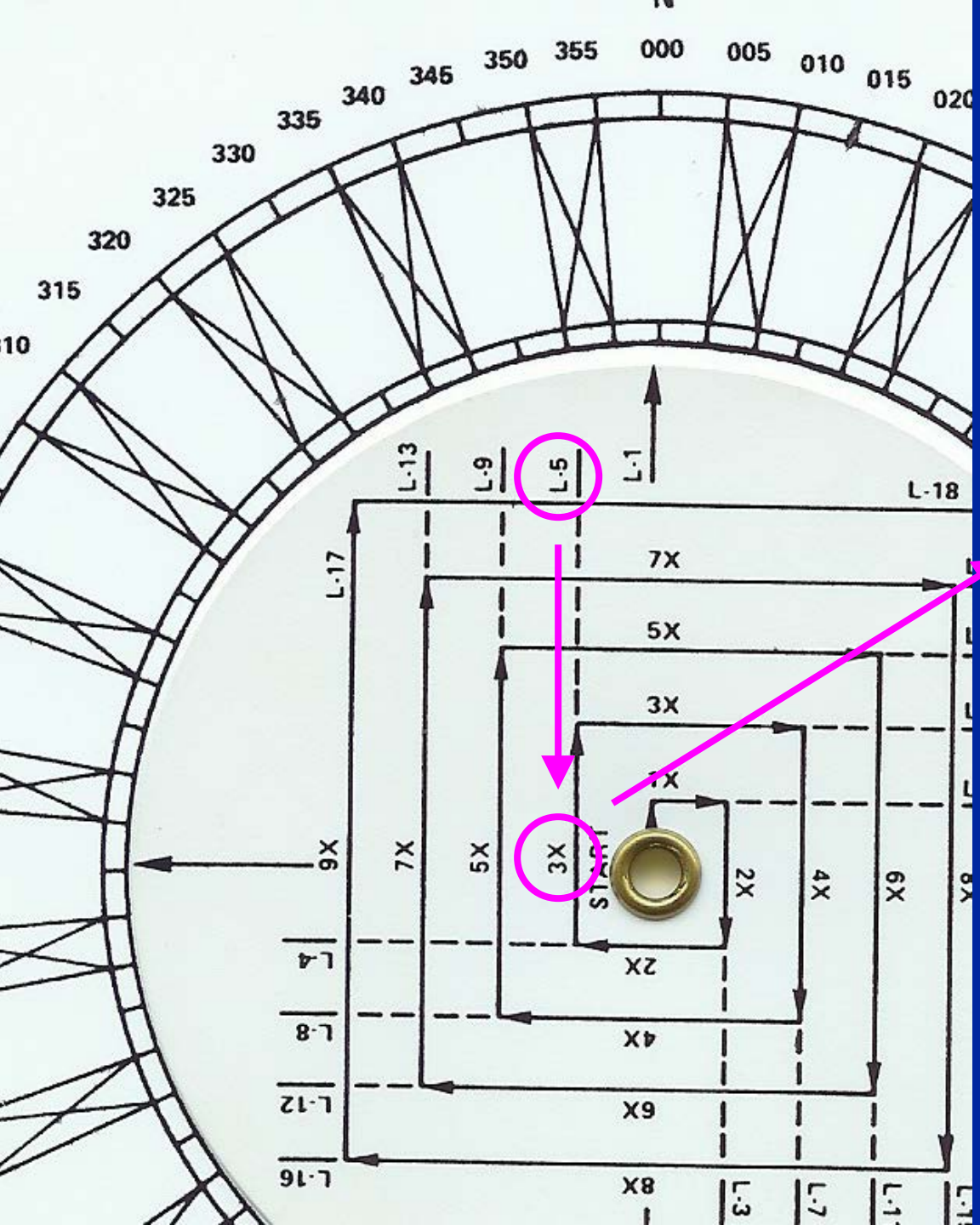
Follow this line out to the edge of the dial to get your course heading

In our example, the heading for Leg 5 is 000 °



The time you should stay on this new heading must be calculated by multiplying X by the multiplier shown on the plotter

Follow the line on the plotter for the new leg (in this case Leg 5) back toward the center of the dial until you see a number in front of the letter X



This is the number you multiply times your value for X to determine the length of the run time for this leg

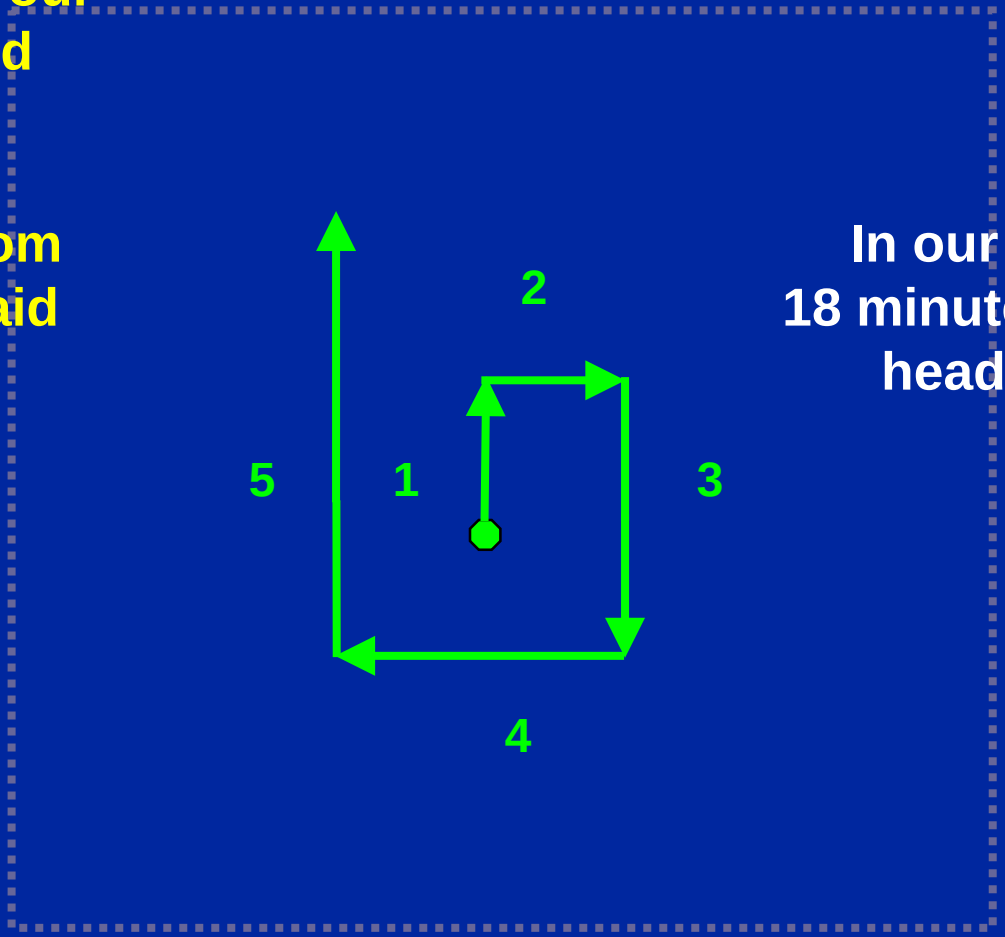
In the case of Leg 5, the number in front of X is 3. So the run time for Leg 5 = 3 * X

In our example the run time for Leg 5 is :

3 * 6 minutes = 18 minutes

Expanding Square Search

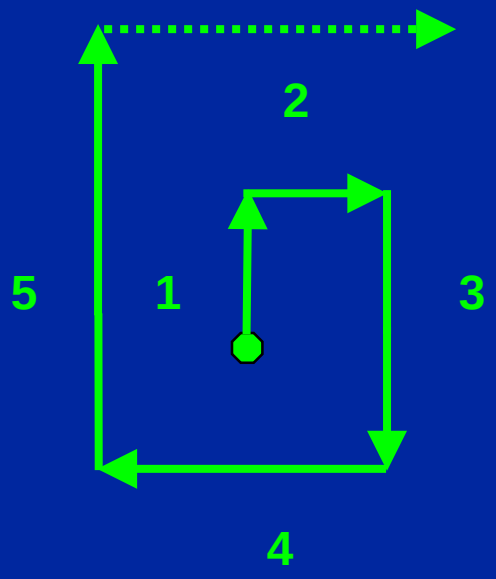
- **Run Leg 5 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**



In our example, 18 minutes at 5 knots heading 000°

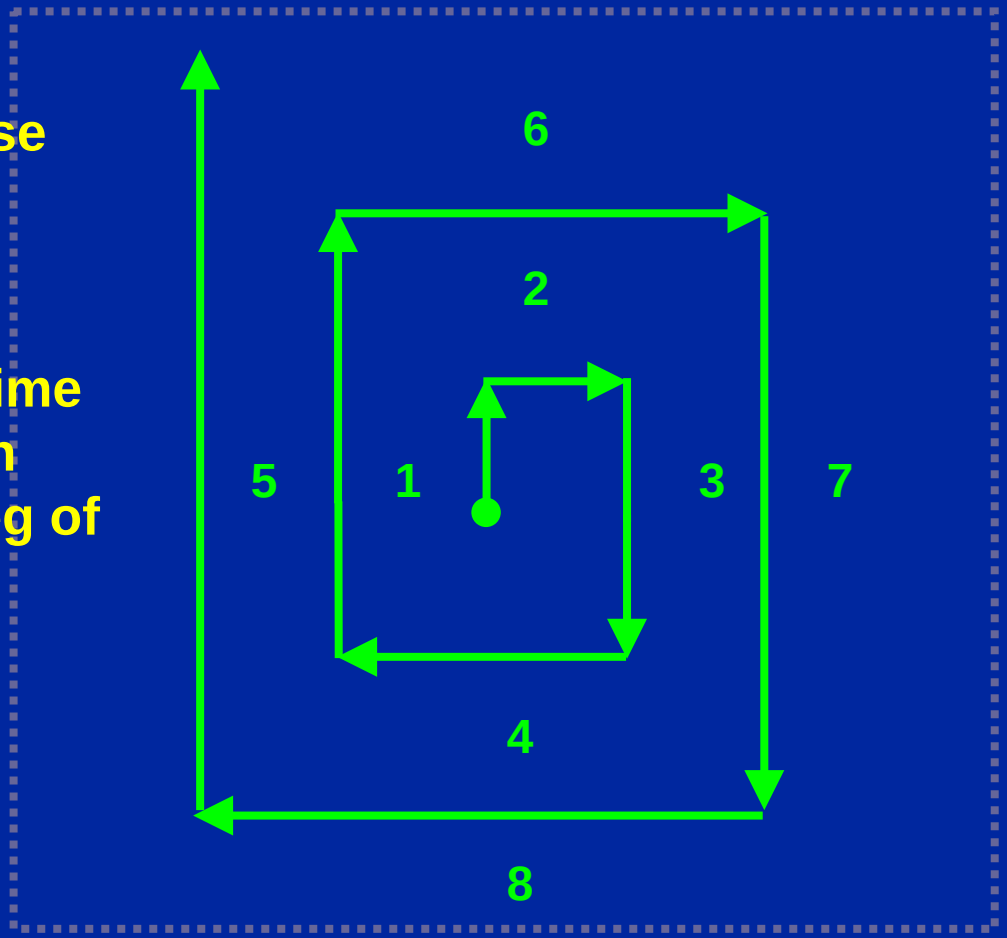
Expanding Square Search

- **Run Leg 5 for the time you calculated at your constant speed and on the heading you determined from your plotting aid**
- **At the end of your calculated time, turn right 90 °**
- **Use your plotting aid to find your new heading and time to run for this next leg**



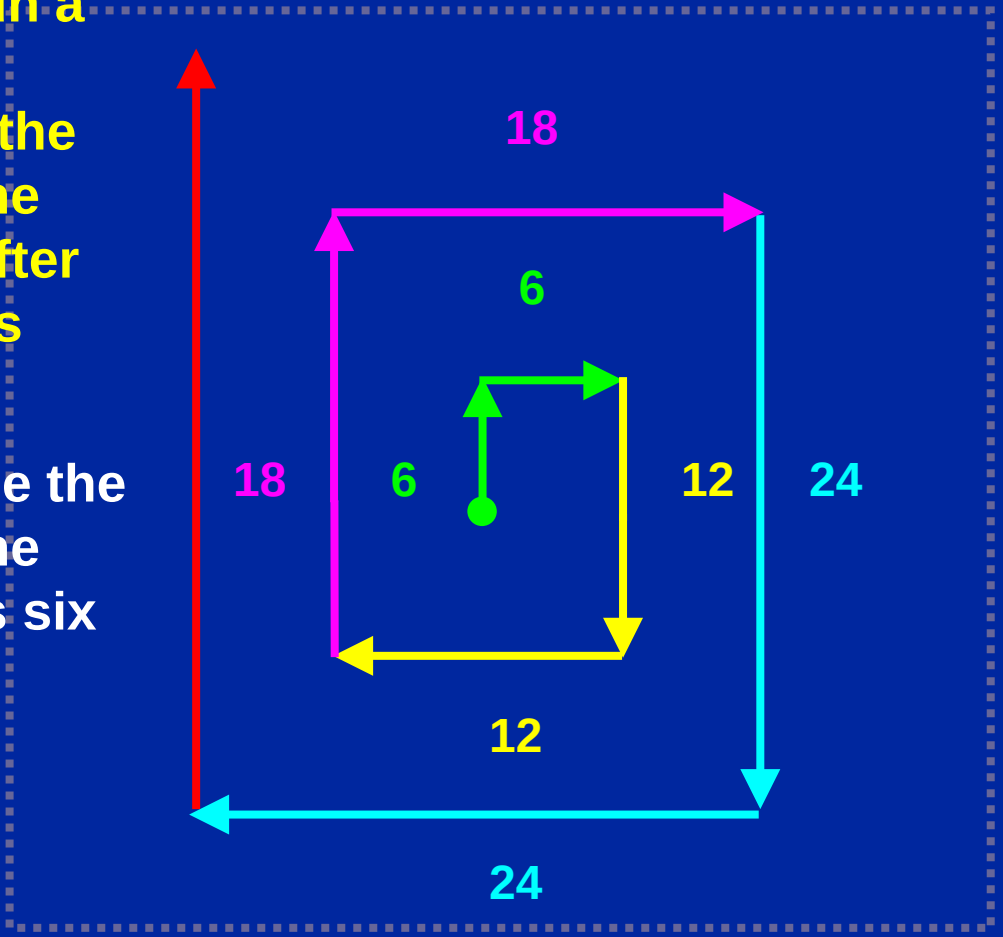
Expanding Square Search

- **Continue to use your search plotter to determine the heading and time to run for each subsequent leg of the search**



Expanding Square Search

- The time to run a search leg is increased by the time to run one track space after every two legs
- In our example the time to run one track space is six minutes



ANY QUESTIONS?