

#### IV. PACING AND COMPASS

##### Objectives

It is often required to estimate distance by the pacing method and to determine direction of travel using a compass. This exercise is designed to emphasize these two skills.

##### Contest Rules

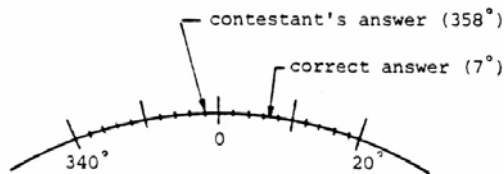
1. Contestants will be required to determine the bearing and distance between a series of marked points in the allotted time. Ground line distances will be used. Compass declinations will not be used.
2. The contestant will start at point "A" and record the bearing to point "B". Then pace to point "B" and record the distance to the nearest foot. The contestant will then measure the bearing and distance from point "B" to point "C". Repeat these steps until all the lines are measured.
3. The course will consist of five bearings and five distances.
4. Calculators will be allowed.
5. The contestant must use the compass provided at the Invitational. Personal compasses may not be used.

##### Scoring

1. Deduct 1 point for each 2 degrees in error.
2. Deduct 1 point for each 2 feet in error.
3. Do not deduct more than 16 points for each bearing and for each distance.

##### Example 1

If contestant is off by  $9^\circ$ .  $9/2 = 4\frac{1}{2}$  points. Round down to nearest whole number. Deduct 4 points from score. Caution: Do not subtract  $358^\circ - 7^\circ = 351^\circ$  and deduct maximum number of points for being  $351^\circ$  off.



##### Example 2

If the contestant determines that the distance between point A and point B is 97 feet and the correct distance is 92 feet:

$$\text{Subtract: } 97' - 92' = 5'$$

$$\text{Then divide: } 5/2 = 2\frac{1}{2}$$

Round down to nearest whole number. Deduct 2 points from score.

## How to Pace and Use a Compass

### Introduction

A compass is an important tool in finding and marking boundary lines and property corners. Knowing this is important because you don't want to cut down your neighbor's trees. When cruising timber (measuring the total volume of timber on a tract of land), a compass is used to keep on a straight path so that the appropriate trees are measured. A map and a compass can help you find your way out of the woods should you get lost or turned around. Also, it can show you the fastest and most direct way back to your vehicle.

### Pacing

It is often too cumbersome and time consuming to use a tape measure when finding your way in the forest. A quick and easy way to measure distance is by pacing. Every two steps that you take is the same as one pace. If you lead off with your left foot, then every time your right foot touches the ground you have gone one pace. It is better to use the number of paces than the number of steps because you won't have to count as high and you will be less likely to lose count.

If you want to measure the distance from point A to point B, you will need two pieces of information. First, you need to know the number of paces between the two points, and that is easily found by counting your paces. Second, you need to know how many feet you have in your pace. This is determined by placing two stakes in the ground exactly 100 feet apart. Count the number of paces that you have between the two stakes. Dividing 100 feet by the number of paces in 100 feet will give you the number of feet in your pace. For example, if you paced 17.5 paces between the stakes, each time you take one pace you have gone 5.7 feet ( $100 \text{ feet} \div 17.5 \text{ paces} = 5.7 \text{ feet/pace}$ ). This number will be different for each person, and therefore you should memorize your number.

Now you are ready to measure distances by pacing. Use the following equation to determine distance:

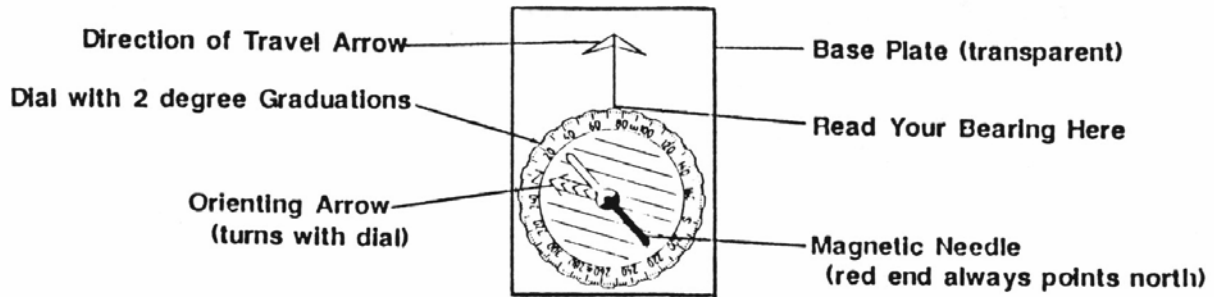
$$\text{distance traveled} = (\text{number of paces} \times \text{number of feet in my pace}).$$

Suppose you wanted to know the distance between your house and a tree in your back yard. You find that it is 15.5 paces long and you have 5.2 feet/pace. The total distance between the house and the tree is simply ( $15.5 \text{ paces} \times 5.2 \text{ feet/pace}$ ) or 80.6 ft (81 feet when rounded).

The key to measuring distances by pacing is consistency, and to be consistent you need to practice. You should walk at a speed that is comfortable for you. When you pace, walk like you always walk. It is not necessary to exaggerate. When determining how many paces you have in 100 feet, pace it over and over and over again until you consistently come up with the same answer. Check yourself from time to time to make sure that this number stays the same. Pace the 100 feet when you are tired and when you are energetic to see if there is a difference. Check yourself on the day of the contest. If you are going to multiply 5.2 times each pace, you will want to be certain that you are indeed going 5.2 feet for each pace.

## Compass

### A. Parts of a Compass



### B. How to Use a Compass

1. Hold the compass in your hand, keeping it in front of your body but away from belt buckles or other metal objects. Turn your body and point to where you are going with the direction-of-travel arrow. Make sure to keep the compass level so that the needle will move freely.
2. Turn the dial until the orienting arrow is directly underneath the red portion of the magnetic needle.
3. Read the bearing (read the number where the direction-of-travel arrow and the dial intersect).

### C. More About Compasses

Suppose that you found that the bearing from point A to point B is  $45^\circ$ . After pacing to point B you decide that you need to double check your bearing to see if it is correct. You could walk all the way back to point A, but that would not be necessary. You can simply point the compass back to A from point B. This time put the orienting arrow underneath the white end of the magnetic arrow. Read the degrees at the same place as before. If you had the correct bearing the first time, you should also read  $45^\circ$  the second time. Sometimes it will be necessary to follow a certain bearing. In this case, set the compass by turning the dial until the desired degree is lined up with the direction-of-travel arrow. While holding the compass correctly, turn your body around until the orienting arrow is directly underneath the red end (the north end) of the magnetic needle. When everything is lined up, find an object in the distance (such as a tree) that the direction-of-travel arrow is pointing at. Walking directly to that object will keep you on your desired bearing.

### Exercises for Pacing and Compass

1. How many feet are in each of your paces? Do you have this number memorized? If you measure 23 paces between your back door and a tree in your back yard, what is the distance between them? (This answer will be different for each person.) Practice your pacing until you consistently get the same answer.
2. Determine the number of paces that you have in 66 feet and memorize this number (66 feet = 1 chain). This will be helpful in tree measurement. Why do foresters use chains when measuring distances?
3. What are the principles of how a compass works? Determine the difference between an azimuth compass and a quadrant compass. What is declination?
4. How is compass used to determine-the direction of travel? How are a map and a compass used together to determine the direction of travel?
5. Lay out a practice course and allow participants to develop these skills. Have somebody hide an object under a rock or behind a tree. See if you can find it given a certain bearing and distance.
6. Use your pacing skills to estimate the number of acres in a field or tract of land. First, pace a line which you feel represents the average width. Pace another line which represents the average length of the field. When pacing these distances use the number of chains as your unit of measurement (see exercise 2). Multiply these two numbers to get the approximate number of square chains in the field. Dividing square chains by 10 will give you the number of acres.