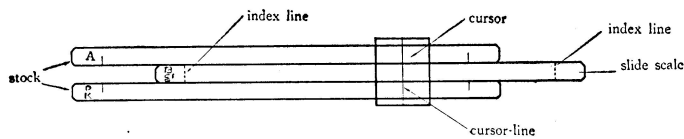


How to use BOOTS RINGPLAN Slide Rules



1. CONSTRUCTION AND SPECIFICATION

The slide rule is constructed of two stocks, one reversible slide scale and a movable cursor with a hairline to assist in setting the figures accurately from one scale to another when making calculations of a complicated nature. The scales are graduated logarithmically and are not suitable for measuring lengths, but the edges of the rule have centimeter and inch graduations which can be used in the normal way. The ends of the moving scale are known as 'left hand index' and 'right hand index' respectively.

2. THE SCALES AND THEIR USES

- Scales A and B are graduated equally from 1 to 100 and are used together with scales C and D for calculating squares and square roots.
- Scales C and D are graduated from 1 to 10 and are the main working scales.
- CI is numbered in reverse, reading right to left, and like C and D can be used in multiplication and division. Extra care should be taken to read this scale correctly.
- Scale K is graduated from 1 to 1,000 and is used in conjunction with scales C and D for calculating cubes and cube roots.
- Scale S on the reverse side of the slide is graduated in degrees to give sines and cosines.
- Scale T is also graduated in degrees to give tangents.
- Scale L is graduated from 1 to 10 to give logarithms

3. THE DECIMAL POINT

In all calculations the decimal points must be ignored and the same location used for the set of figures wherever the decimal point is located in the numbers. *e.g.* 0.0791, 0.791, 79.1 all have the location 791. A separate estimation to reposition the decimal point, by common sense or rough calculation, is made when the answer has been located.

4. MULTIPLICATION AND DIVISION

Scales C and D and CI are used, and multiplication can be done by either of two methods, the answer appearing in both cases, as in division, on scale D.

Multiplication

Method 1—e.g. $2 \times 4 = 8$

- Set the cursor line on the digit 2 of the scale D.
- Move the CI scale and place the digit 4 under the same line.
- The answer (8) can then be read off on the D scale below the right hand index of the slide.

Method 2—e.g. $2 \times 4 = 8$

- Set the cursor line over 2 on the D scale.
- Move the slide so that the left hand index is aligned with that same number.
- Move the cursor to the number 4 on the C scale and the answer (8) will appear under the cursor line on the scale D.

Division

e.g. $8 \div 2 = 4$

- Move the cursor line over the number 8 on the D scale.
- Move the number 2 of the C scale under that same number.
- Read the answer (4) under the left hand index of the sliding scale. (If, of course, one were dividing 16 by 2 the answer, being 8, would appear under the *right* hand index of the scale).

Both

e.g. $31.5 \times 4.82 \div 19.2 = 7.91$

- 31.5×4.82 . Using either method 1 or 2 to multiply, we arrive at 152.
- $\div 19.2$. Move this number on scale C above 152 on D and finally read off 791 on the D scale below the right hand index.

5. SQUARES AND SQUARE ROOTS—Scales D and A

To find the square of a number, read off on the A scale that number which corresponds to the one you wish to square on the D scale—thus 5 on the D scale = 25 on the A. The reverse procedure gives the square root.

6. CUBE AND CUBE ROOTS—Scales D and K

The cube of a number is obtained by setting the cursor line over the number on the D scale and reading the cube on the K scale. Reverse the procedure and you have the cube root.

7. RECIPROCAL

Scales D or C and CI are used, taking care to remember that CI reads from RIGHT to LEFT, as it is numbered in reverse. *e.g.* for $1/2.7$, set the scales together and locate 2.7 on scale D with the cursor line. The answer will appear on the CI scale as 0.371 (*not* 0.429).

8. PROPORTIONS

Proportions are computed by reference to scales C and D. This method can be applied to various calculations such as conversions, proportional allotment and percentage calculations.

e.g. There are 20 pencils to be allocated as follows:

A: 45% B: 35% C: 20%

How many pencils will actually be shared to each?

- Set the left hand index of scale C on the digit 20 of the D scale.
 - Then locate with the cursor line, each of the numbers 45, 35, 20, on scale C, reading off on scale D the numbers 4, 7, 9 respectively.
- To calculate percentages, given the correct number of pencils, simply reverse the above pattern, *i.e.*, having placed the left hand index of the sliding scale at your total number on scale D, locate the divided number of pencils on the D scale and read off the percentage on the C scale.

9. INVERSE PROPORTIONS—Scales D and CI

e.g. 6 men can do a job in 30 days.

1. *Question:* How many days would 4 men take to do it?

2. *Question:* How many men will be necessary to do it in 20 days?

- Align 30 on the CI scale with 6 on the D scale.
 - Read off on CI scale the number aligned with 4 on the D scale and you have the answer, 45.
- Leaving the slide where it is, move the cursor line over 20 on the CI scale. Find the answer below on scale D, which reads 9.

10. SINES AND COSINES—Scales S and D

With the slide reversed and the scales together, put the cursor line over the degree on scale S and read off the decimal answer on scale D.

e.g. Sin 35° = 0.574.
Sin 45° = 0.707.

Cosines are found in the same way, having first translated the Cos into its Sin equivalent ($\text{Cos } X^\circ = \text{Sin } 90^\circ - X^\circ$).

Hence: $\text{Cos } 35^\circ = \text{Sin } 55^\circ = 0.819$.

11. TANGENTS—Scales T and D

Set the scales together and read on scale D the tangent of the angle which is at scale T.

e.g. Tan 25° = 0.466.

12. LOGARITHMS—Scales C and D

Set the scales together and, placing the cursor line over the number on the D scale of which you wish to find the logarithm, read off on the L scale the decimal answer.

e.g. Log 2.45 = 0.389.

CLEANING

When it is necessary to clean the plastic, a minimum of soap and water (not hot) should be used. Care should be taken to avoid any chemical solvents, as the plastic may be defaced. Conditions of heat or damp should also be avoided.