STERLING SLIDE RULE
OPERATING INSTRUCTIONS
A quality instrument for student or professional
A complete course in use and operation of slide rule

The Sterling Student Slide Rule is an accurate instrument for use in multiplication, division, proportions, square and cube root problems, as well as slide, tangent and logarithm solutions.

The reading of any slide rule is accurate to the second place in decimal work, therefore, approximations of the third place number can be done by mental calculation, by multiplying the last two numbers together and using the last figure as third number in these calculations. Accurate figures beyond this must be done by actual multiplication on paper.

MULTIPLICATION AND DIVISION
For this work, use only the C and D scales, and in some cases the C' scale. The C and D scale start with 10-cent 1 at the left, then the unit 10 (or 1) at the right. This means that the first digit in the multiplier and the last digit in the multiplicand will be one place less than the exact answer. Thus, the numbers in the following equation will be one place less than the exact answer:

\[ 1.2 \times 1.5 = 1.8 \]

Similarly, you will note that \( 3 \times 2 = 6 \), \( 4 \times 2 = 8 \), \( 5 \times 2 = 10 \) or 10 as you read across the scale.

In many problems, the scale can represent 2, 20 or 200. Also remember that the answer to the problem always appears on the same scale from which you started, usually the D scale.

DIVISION:
Since division is the reverse of multiplication, we reverse the procedure shown in multiplication, as follows: Problems divide 4 by 2. Start with 4 on the D scale. Move to right until 2. Over the result lies the left.

5 \( \times 6 \) (of C over 5 of D - read 1 or 10 against 2 of C)
NOW TRY THESE PROBLEMS
5 \( \div 4 \) (of C over 5 of D - read 1.25 against 1 of C) (SEE BELOW)

For numbers which when multiplied are greater than 10, it is necessary to use the same effect by using the right

USING THE C SCALE:
The C scale is the same as the C' scale, it reads from right to left. This scale is the RECIPROCAL of the C scale, and can be used to avoid the necessity of moving the slide left or right.

EXAMPLE: 4 \( \times 6 \) - Reading from the RIGHT on C, place the 4 above the 6 on D, push the slide left hand 6 on C, read 24.

The C scale represents the fraction (decimal) of the C scale.

EXAMPLE: \( \frac{1}{8} \) - 0.125 against 8 on C, read 0.125 on C. (SEE BELOW)
USING THE A OR B SCALE:
The A and B scales are made up of 2 half size or half length logarithmic scales, therefore they are the SQUARES of the D and D scales. For practice, repeat the study. You must clearly read A against the B scale. Slide the chart and turn the slide, until the hairline is over 3 on D—you will then see the square of 3 on B.

The square of 25 on D is 625 on the right side of A. (SEE BELOW)

SQUARE ROOT:
Since the A scale is the square of the numbers on D, in turn, the numbers on A are the square roots of the numbers on D. Of prime importance here is which half of the A scale to use when putting the number to be divided into the left side of the "root" rule. The rule for this is simple. If 2 odd number of digits, use the left scale. If the number of digits, use the right scale.

250

USING THE K SCALE:
The K scale, you will note, consists of 3 log scales instead of 2 as in A. The result is that these figures are the SQUARES of the D scales figures. 3 X 3 X 3 = 27, or the cube of 3 can be read directly on K by placing the cursor over 3 on D and reading 27 on the MIDDLE part of K scale. Also, the CUBE ROOT of 27 is 3, and is read on MIDDLE scale as 3 X 3 X 3. Since there are 3 scales, left middle, and right, the rules for use of these in determining the number to put into the rule, the left scale is for numbers of 1 digit, the middle scale for 2 digit numbers, the right scale for 3 digit numbers. The rule to be learned is as follows: FROM THE DECIMAL POINT, divide the number into groups of 3 digits. Now, skip over the groups of 3 next to the decimal, and determine the number of digits in the "outside" figures. If it is only 1 digit, use the left part of the K scale in your computation. If 2 digits, the center part of K, if 3 digits, the right side of K. For instance:

125 has 3 digits left of decimal—use right side K = 5
2125 has 3 digits left of decimal—use right side K = 5
52125 has 5 digits left of decimal—use right side K = 5

THE L SCALE:
This scale is actually a graduated scale exactly 250 millimeters long. It is graduated into 50ths of this length. This is the same as the log scale. Therefore, by reading a number on this scale, we can find the logarithm of any number on the D scale. Note that the numbers are preceded by a decimal point, reading therefore from 1.0 to 9.0. Place one index of the "L" scale against the log number on D. Read the answer against the other factor at end of D scale. (SEE BELOW)

THE S SCALE:
This scale is for direct reading of the sines of angles. The scale is divided in degrees, minutes, and seconds. The scale is used in conjunction with the A scale to read the angle directly. It should be noted that scale division must be carefully judged, since the scale decreases rapidly. The scale divisions are in minutes (30' EQUAL 1'). (with degree numbers in 10s)

THE T SCALE:
The tangent scale starts at 5.7° and increases up to 45° on the right. To find the tangent of 6.4° or 6.75° place the hairline over 6.4° or 6.75° of log or 6.45° on T scale and read .1185 on the D scale. (SEE BELOW)

It can be seen here also that multiplication of the sine of the tangent is only a matter of finding the sine or tangent of the required angle, then transferring this to the D scale, by reversing the slide, and, putting the 1 of the C scale over the hairline.

To determine the Sine of an angle, follow this example:
Sin 15°48'—Set hairline over 15°48' on T scale—read .2727 on A. (SEE ABOVE)

(remember that the left scale on A is .1 of right scale. Therefore an additional decimal is required.)

Sin 4°20'= .0756

CUBE ROOT: 125 (D & K scales—right side of K because of 3 digits)

Answer is 5 on D scale.

Log 6 (REVERSE SLIDE—Use L and D scales)—.778
Sin 13.4° or 13°36'—The A scale, Answer: .222
Tangent 6.75° or 6.45°—T and D scale—.1185

ASK FOR AND USE STERLING ARCHITECT AND ENGINEERS SCALE RULES, PROTRACTORS AND TRIANGLES. Accurate and clear material for all problems in linear measurement, angle and radial computation, STERLING on the product is its guarantee of QUALITY.