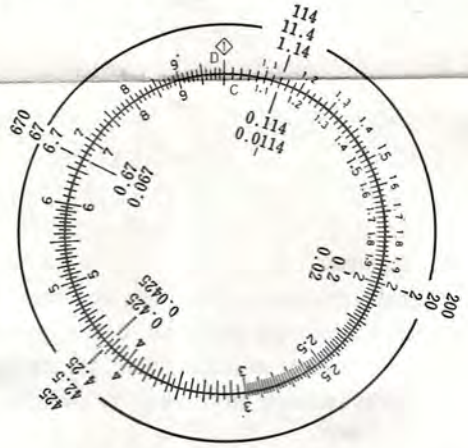
CIRCULAR SLIDE RULE
INSTRUCTION MANUAL FOR
NO.1001 & NO.1002

Chapter 1 Reading the Scales

In order to make use of the slide rule at your own will, you have to begin with practice of reading the each scale quickly and accurately. Slide rule's scales are "even" ones like those of a thermometer or a measuring instrument we are using in our daily lives. Consequently, you can read the scales in the same way as they are, however slide rule's scales are featuring the follwing points,

(1) Starting from 1, as you read 2, 3------, scale division is getting narrower and narrower. Therefore, the degree of subdivision between figures 1 and 3, 3 and 6, 6 and 1 (10) is not the same. The minimum division between 1 and 3 is 0.02, between 3 and 6 is 0.05 and between 6—10 is 0.01.

(2) The scale is read without regard to decimal point location. For example, 2 in scale D may be read 20, 200 or 0.2, 0.02 etc., a slide rule will not determine the position of tne decimal point for us. Sometimes the position of the decimal point will be obvious. Sometimes mental arithmetic will have to be used. Once the user can read the scales of his slide rule, the rest is easy.



On the contrary, when ignoring the decimal point, since a figure such as 42.5 or 0.0425 is written 425 (four two five), every one of these figures is set 4.25 in scale D.

Chapter 2. Multiplication and Division

1. Division

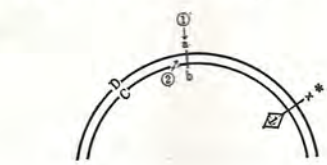
Can be calculated by following fundmental operation

$a \div b = x$

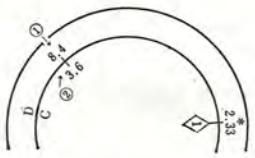
(1) Set the hairline (a red line) over **a** on the D scale

(2) Move the revolving plate, set **b** on the C scale under the hairline.

* Read the answer on the D scale opposite the index of the C scale.



Ex. 8.4 ÷ 3.6 = 2.33



(1) Set the hairline over 8.4 on the D scale.

(2) Move the revolving plate, set 3.6 on the C scale under the hairline.

* Read the answer 2.33 on the D scale opposite the index of the C scale.

2. Multiplication

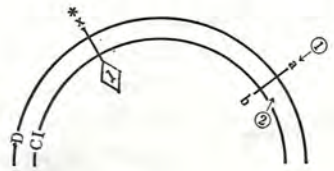
Can be accomplished on D and CI scales.

$a \times b = x$

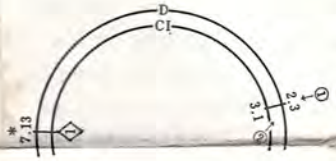
(1) Set the hairline over **a** on the D scale.

(2) Move the revolving plate, set **b** on the CI scale under the hairline.

* Read the answer on the D scale opposite the index of the CI scale.



Ex. 2.3 × 3.1 = 7.13



(1) Set the hairline over 2.3 on the D scale.

(2) Move the revolving plate, set 3.1 on the CI scale under the hairline.

* Read the answer 7.13 on the D scale opposite the index of the CI scale.

Exercise

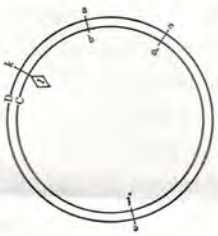
5.7 ÷ 7.8 = 0.731	1.61 × 3.15 = 5.06
23.6 ÷ 6.92 = 3.41	59.6 × 0.205 = 12.2
528 ÷ 30.6 = 17.3	846 × 0.871 = 737

Chapter 3. Proportion

(1) Proportion

When **a** on the C scale is set opposite **b** on the D scale, it indicates

$\frac{a}{b} = k$



Leaving the revolving plate at that, when **c** on the D scale corresponds to **d** on the C scale, it indicates

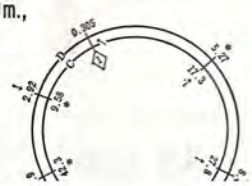
$\frac{c}{d} = k$

That is to say, they can be shown:

$\frac{a}{b} = \frac{c}{d} = k$

Utilizing this nature, once the revolving plate is set in any position under the given conditions, you can calculate propotions problems, such as percentages, coversion by only moving the hairline.

Ex. Knowing that 1 ft. is equal to 0.305 m, convert 27.8 ft., 17.3 ft. into meter, and convert 12.9m., 2.92m. into feet.



Correspond 1 ft. on the C scale to 0.305 m on the D scale. Read the answer 8.47 m on the D scale opposite 27.8 ft. on the C scale.
Read the answer 5.27 m on the D scale opposite 17.3 on the C scale.
Read the answer 42.3 ft. on the C scale opposite 12.9 m on the D scale.
Read the answer 9.58 ft. on the C scale opposite 2.92 m on the D scale.

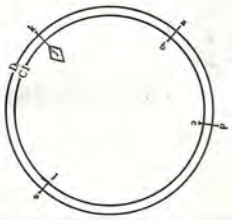
Exercise

$$\frac{6.4}{2.52}=\frac{x}{3.35}=\frac{4.14}{y}=\frac{z}{41.4}$$

Ans. $x=8.5$, $y=1.63$, $z=105$,

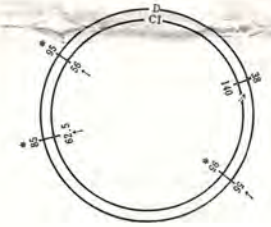
(2) Inverse Proportion

The inverse Proportion problem that product of $a\times b$ is uniform can be accomplished by the same operation as that of proportion.



Correspond b on the CI scale to a on the D scale.
Read the answer d on the D scale opposite c on the CI scale.
Read the answer f on the CI scale opposite e on the D scale.

Ex. A bicycle runs at 38 miles per hour, and takes 140 minutes to go from one town to another. Calculate how many minutes it will take when the bicycle is travelling at 56 miles per hour and 62.5 miles per hour.



Correspond 140 minutes on the CI scale to 38 miles on the D scale.
Read the answer 95 minutes and 85 minutes on the D scale each opposite 56 miles and 62.5 miles on the CI scale. Another solution is to read the answer 95 minutes on the CI scale opposite 56 miles on the D scales.

Chapter 4. Squares and Square Roots

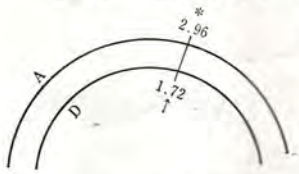
(2) Squares

When the hairline is set over x on the D scale, x^2 appears under the hairline on the A scale. A value on the D scale is read as figures between 1−10 and a value on the A scale is read between 1−100. Except when x locates between 1−10, it is shown that $x=y\times10^n$ (y is limited between 1−10), you can find the answer as $x^2=y^2\times10^{2n}$

Ex. $1.72^2=2.96$

$17.2^2=(1.72\times10)^2=1.72^2\times10^2=2.96\times10^2=296$

$0.172^2=(1.72\times10^{-1})^2=1.72^2\times10^{-2}=2.96\times10^{-2}=0.0296$

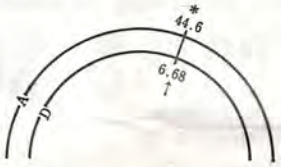


Set the hairline over 1.72 on the D scale, read 2.96 on the A scale under the hairline.

Ex. $66.8^2=4460$ $0.0668^2=0.00446$

$66.8^2=(6.68\times10)^2=6.68^2\times10^2=44.6\times10^2$

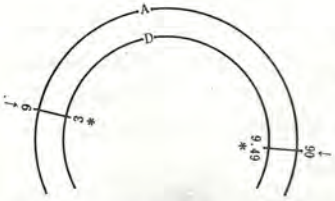
$0.0668^2=(6.68\times10^{-2})^2=6.68^2\times10^{-4}=44.6\times10^{-4}$



(2) Square Roots

Set the hairline over x on the A scale, read a value on the D scale under the hairline. In this case, a value, x on the A scale is limited between 1−100, in other figures outside this scope, you must reform that $x=y\times10^n$ (y is limited between 1−100, n is even numbers), you can find the answer as $\sqrt{x}=\sqrt{y}\times10^{\frac{n}{2}}$

Ex. $\sqrt{9}=3$ $\sqrt{90}=9.49$

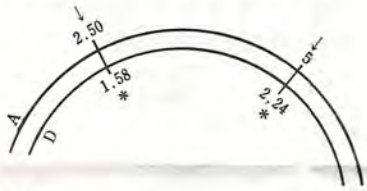


Set the hairline over 9 on the A scale, read 3 on the D scale under the hairline.
Set the hairline over 90 on the A scale, read 9.49 on the D scale under the hairline.

Ex. $\sqrt{250}=15.8$ $\sqrt{0.0005}=0.0224$

$\sqrt{250}=\sqrt{2.50\times10^2}=\sqrt{2.50}\times10=1.58\times10=15.8$

$\sqrt{0.0005}=\sqrt{5\times10^{-2}}=\sqrt{5}\times10^{-2}=2.24\times10^{-4}=0.0224$



Exercise

$3.8^2=14.4$	$0.76^2=0.577$
$13.5^2=182$	$\sqrt{4.55}=2.11$
$\sqrt{272}=16.5$	$\sqrt{0.00605}=0.0778$

Chapter 5. Logarithms

No. 1001 circular slide rule is provided with the L scale to find logarithms. The L scale is uniformly divided from 0 to 1 and used with the D scale to obtain mantissa of common logarithms. The characteristics of the logarithms must be separately determined by the given number.

Ex. $\log_{10}2.43=0.386$ $\log_{10}^{-1}0.657=4.54$

$\log_{10}24.3=1.386$ $\log_{10}^{-1}1.657=0.454$

* Set the hairline over 2.43 on the D scale, read the answer 0.386 on the L scale under the hairline.
* Set the hairline over 0.657 on the L scale, read the answer 4.54 on the D scale under the hairline.

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