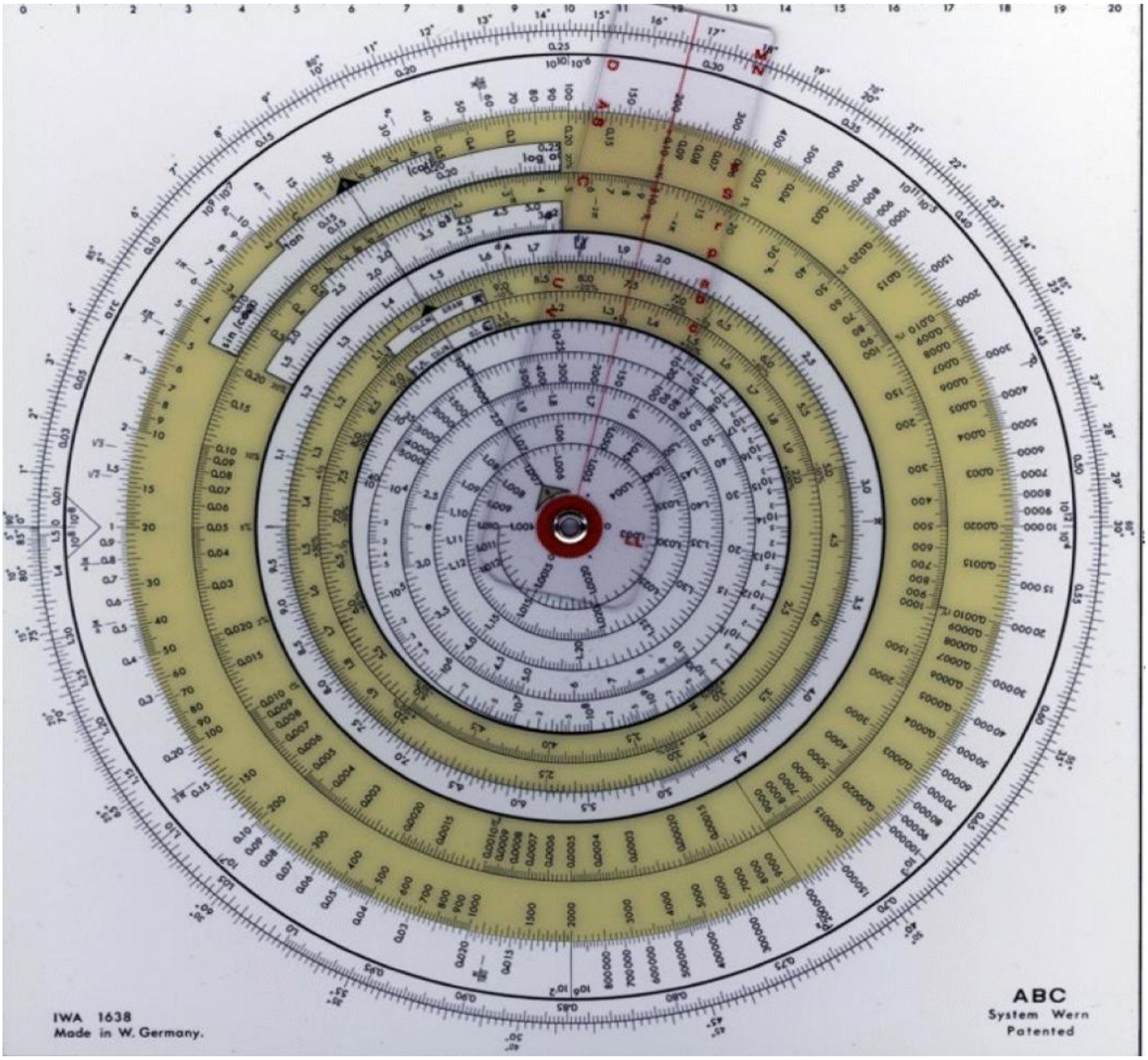
System Wern
Decimalpoint Slide Rule Calculator



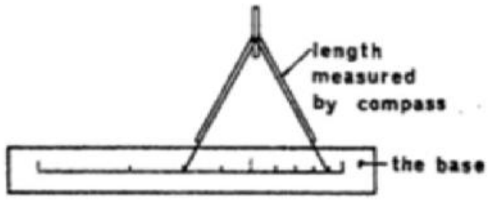
IWA 1638 Manual 2

Brief Historic for slide rule rules

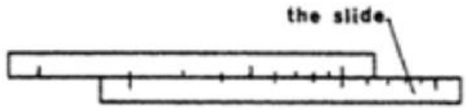
Slide rule is a calculating aid used from the 17th century up until the 1970s when electronic calculators came into the market and killed the slide rule market.

Archimedes (287 - 212 BC)
Archimedes, the greatest mathemacian in antiquity, was the first man to understand that multiplication of any two numbers can be done simply **by adding corresponding numbers so called logarithms**. Actually, he stumbled on the invention of the slide rule.

Edmund Gunter (1581 - 1626)
Gunter was an english clergyman who invented the logarithmical scale. Gunter´s scale refers to the logorithmically divided scale using a **compass.**

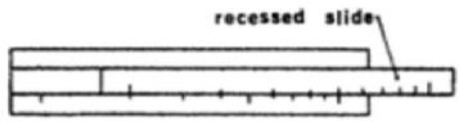


Edmund Wingate (1596-1656)
Wingate made the first approach toward a slide rule 1627, **two separate rulers** used against each other.

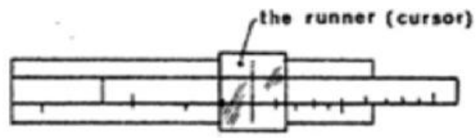


Willliam Oughtred (1574 - 1660)
Oughtred discovered in 1630 when he placed alongside each **two logarithmic scales and sliding the edges together** the method used by Gunter. The slide rule approach was made.

Seth Partridge (1603 - 1686)
Partrige, an englishman improved the Gunter rule discovering in 1657 the sliding principle.
This became **the first assembled slide rule** in history.



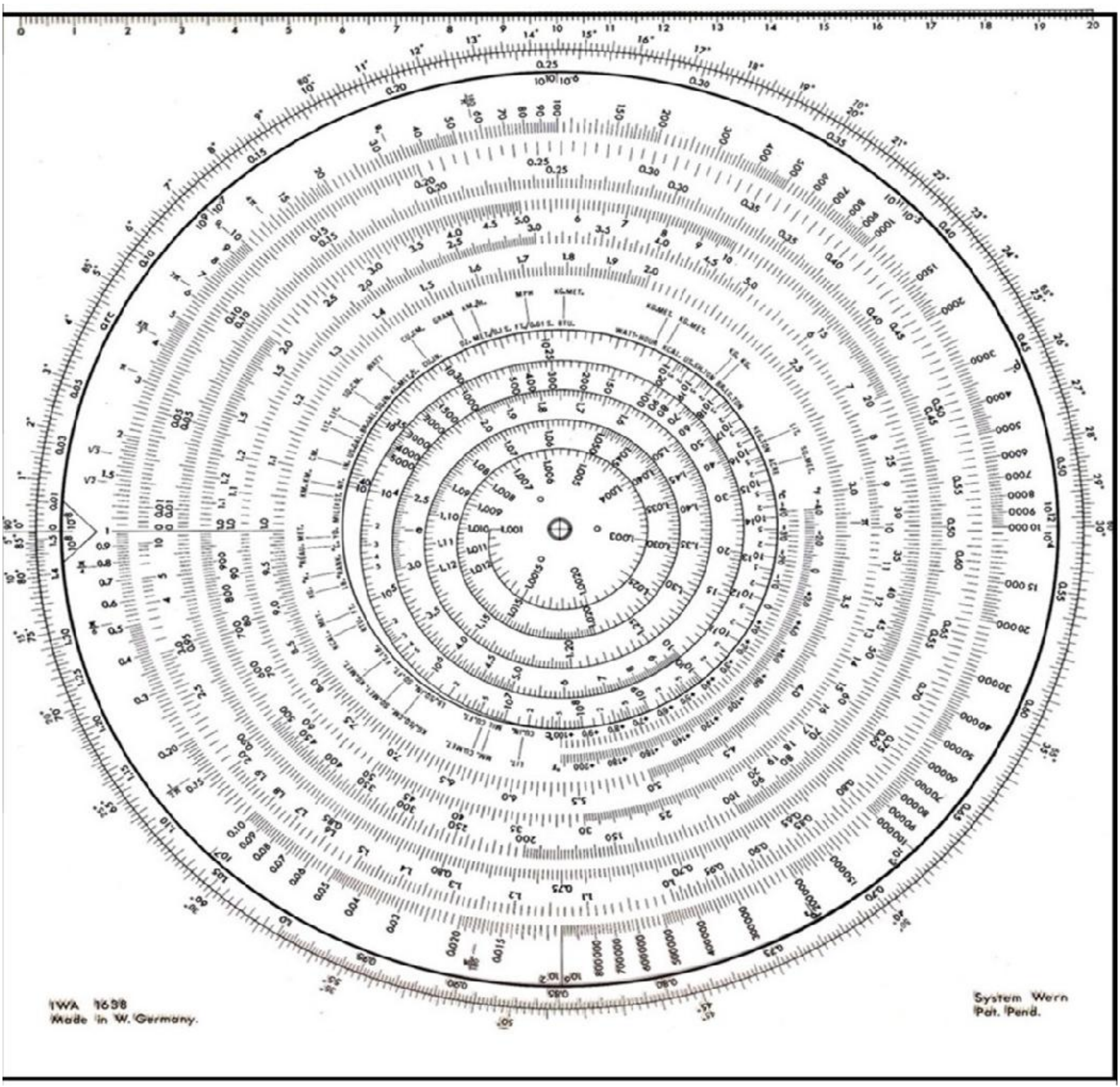
Amédèe Mannheim (1831 - 1906)
Mannheim, a frenchman introduced the **runner** on the slide rule around 1850. He introduced a new scale system that used a runner to perform calculations.



1966. Wern, Carl, George and Lars
System Wern Decimal point slide rule was invented in 1966 as a new approach to simplify slide rule computing work for all categories including decimalpoint location.
In fact, it is actually capable of simulating a multlplication or division set up as you would write it by hand, for instance 0.03 • 5000 = 150. It gives direct read-out of the **DECIMAL POINT LOCATION and also of the OPERATION SET UP.**
Our goal was:
Every person should be able to use a slide rule - not only engineers and students.

NOTE
Carl R. Wern created the slide rule design layout together with his two younger brothers George H. Wern and Lars A. Wern here in Sweden year 1966.
A slide rule prototype was presented at the International Invention Exhibition in Brussels 1966.
The System Wern decimalpoint slide rule handmade prototype 630 x 630 mm was awarded a gold medal and Diplom. Drawings made up manually by Carl had a very high accuracy, 0,05 mm.
IWA Rechenshieberfabrik in West Germany was contacted to manufacture the product under a license agreement to maintain high precision during production with a precision of 0,05 mm.
All calculators had to be checked against 3 dots on the slide ruile that should be within a circle when controls was made by rotating the slide top disc at 3 locations.

IWA 1638. Bottom view of slide rule



Slide rule Display 1966.

Gold Medal Award

Lars - Carl - George

GENERAL NOTES FROM 1966.

Slide rules have become a natural aid for technical and business calculations and anywhere, where the accuracy not necessarily must be better than 1 %. Education in how to make use of the slide rule is provided in schools (it speeds up routine calculation work and provides thereby more time for theory) and slide rule devices appears to be recognized by everyone as useful tools not only purposed for engineers.

Unfortunately, the slide rule has since its very beginning been associated with a drawback limiting its market: One has to determine where to place the decimal point. Several "thumb rules'* have been employed to reduce the importance of this drawback. It is in schools recommended to determine the decimal point location by means of a very rough calculation, any "thumb rules" are not recommended. The extra time for the slide rule settings gives the total time to get the result.
It has probably been considered as impossible to develop a multipurpose slide rule providing the decimal point and still maintaining sufficient accuracy in computations.

Since the start 300 yeare ago, the slide rule manufacturers have continually improved their product. But until now 1966, they have falled to solve the problem with the decimal point. Slide rule users have been forced to do the decimal figuring themselves.
That has made the slide rule unnecessarily difflcult and the same can be said about the procedure of settings.
In year 1966 the first decimal point slide rule was available in the market.
It supplies all the computation possibilities of other slide rule devices and succeeds to also allow DIRECT READ-OUT of the decimal point location.
It eliminates old slide rule drawbacks.

Furthermore, the multiplication and division settings simulate the way the operations are written out, which is a unique approach that greatly simplifies this slide rule as compared with other slide rules.
The slide rule instruction refers to letter symbols labelled on the runner covering their respective scales. The advantage with having all the scales labelled on the runner is, that then all the labels are adjacent to the runner hair line, there the settinge are made.
In fact, it actually is capable of simulating a multlplication or division set up as you would write it by hand, for instance 0.03 • 5000 = 150. It gives direct read-out of the DECIMAL POINT LOCATION and also of the OPERATION SET UP.

The slide rule user can make settings and read numbers from 0.0001 up to 1.000.000. Or in exponential notation wlthin a range of 20 decimal periods, and for power calculations extended up to 40 decimal periods. The desired number is found directly and sufficient accuracy is always maintained.

All of the following calculations employ direct read-out:
Powers, roots, trlgonometrical values, logarithms with arbitrary base, percentage calculation involving margin and mark up problems, 61 popular unit converslons - such as kilometers to miles, kilograms to pounds, ^{o}C to ^{o}F, etc.
Slide rule available, size, 21 • 21 cm comes with a plastic cover.

The instruction sheet is including 61 solved problems.
There was no other instruction made out since all problems was self-explained.

INSTRUCTION: HOW TO USE system Wern slide rule.

This manual is replacing instructions that was supplied when IWA was manufactured.
This manual for IWA 1633 is based on notes put together which was made back in 1966.

DIRECT READ-OUT is a new approach to simplify slide rule computing work for technical people, businessmen and students. It is now applied for the first time on a slide rule called "system Wern".
System Wern slide rule is a circular slide rule consisting of the following four mechanical parts: A square base plate, a circular slide disc, a rectangular runner and a precision rivet.
The square base plate contains most of the scales. The circular side disc is provided with transparant windows for reading some underlying scales on the base plate.
The runner carries the multiplication and division signs and carries also letter labels marking the underlying scales. The runner is also carrying an index hair line.

Multiplication - use scales A and B or scales a and b.
Find the first number on the scale **A**.
Mark it with the runner hair line.
Find the second number on the scale **B**.
Turn it to the runner hair line. Notice the multiplication sign.
Read the result on the scale **A** as marked by the black arrow.
The result above is obtained with an accuracy better than 1 %.
If the scales **a** and **b** are used, then the accuracy is better than 0.2 %, but the decimal point location is not provided.

Division - use scales A and C or scales a and c.
The same procedure as above applies. Notice the division sign.

Inversion - use scales B and C or scales b and c
Find the number on the scale **B**.
Mark it with the runner hair line.
Read the reciprocal value under the hair line on the scale **C**.

Unit conversion - use scales A and C and the windows A and C.
Find in the windows **A** and **C** the appropriate unit conversion.
Mark it with the window hair line.
Turn the runner to find corresponding unit values under the runner hair line:
The unit in window A is related to the scale **A** and
the unit in window **C** is related to the scale **C**.

Squares - use scales **a** and **p** and the runner hair line.
Square roots - use scales **p** and **r** and the runner hair line.
Cubes - use scales **a** and **r** and the runner hair line.
Cube roots - use scales **r** and **a** and the runner hair line.
^{10}log a - use scales **a** and **S** and the runner hair line.

Sines and cosines - use scales **M** and **S** and the runner hair line.
Tangents and cotangents - use scales **M** and **T** and the runner hair line.
Conversion between radians and degrees - use scales **N** and **M** and the runner hair line.

Power computations - scale c and the helical scales LL
Find the base value on the helical scale.
Mark it with the runner hair line.
Find the exponent on the scale **c**.
Turn it to the runner hair line.
Read the result on the helical scale as marked by the yellow arrow.

Since the yellow arrow marks five values on the helical scale, the choice between them is simplified by the following rule:

If the exponent is between 1 and 10 as marked on the scale **c**, then the result is obtained by following the helical scale from the base value towards increasing values and stopping at the yellow arrow hair line.

If the exponent is 10 times larger than as marked on the scale **c** then the result is obtained one step further outwards at the yellow arrow hair line.

If the exponent is 10 times less than as marked on the scale **c**, then the result is obtained one step closer to the center at the yellow arrow hair line.

Etc

Root computations - scale **b** and the helical scales **LL** (1-5),
Find on the helical scale that number, for which the root is to be computed.
Mark it with the runner hair line.
Find the root index number on the scale **b**.
Turn in to the runner hair line.
Read the result on the helical scale as marked by the yellow arrow.

Since the yellow arrow mark five values on the helical scale, the choice between them is simplified by the following rule:

If the root index is between 1 and 10 as marked on the scale **b**, then the result is obtained by following the helical scale from the number marked by the runner hair line towards decreasing values and stopping at the yellow arrrow hair line.

If the root index is 10 times larger than as marked on the scale **b**, then the result is obtained one step closer to the center at the yellow arrow hair line.

If the root index is 10 times less than as marked on the scale **b**, then then result is obtained one step further outwards at the yellow arrow hair line.

Etc.

<u>Logarithm computations</u> - scale **c** and the helical scales **LL** (1-5),
Find on the helical scale that number, for which thle logarithm is to be computed.
Mark it with the yellow arrow hair line.
Find the logarithm base on the helical scale.
Mark it with the runner hair line.
Read the result on the scale **c** under the runner hair line.
Since the scale **c** is graduated only for the interval 1 to 10, the following rule is helpful for results outside that interval.

If the logartihm base of all the five values on the helical scale under the runner hair line is closest less than the number, for which the logarithm is to be computed, then the result is as read on the scale **c**.

If the logarithm base is located one step closer to the center under the hair line, then the result is 10 times the result as read on the scale **c**.

If the logarithm base is located one step further outwards under the halr line, then th result is 10 times less than the result as read on scale **c**.

Etc.

<u>The exponential notations on the scale D.</u>

Multiplication and division results are provided with direct read-out from 0.01 to 1 000 000.

If the result is estimated to be beyond 1 000 000, then the result, as read on scale **A** is to be multiplied by <u>10^{8}</u> (or move the decimal point 8 steps to the <u>right</u>).

And if the result is estimated to be below 0.01, then the result, as read on scale **A**, is to be multiplied by <u>10^{-8}</u> (or move the decimal point <u>8</u> steps to the <u>left</u>).

IWA 1638 - Manual Instructions

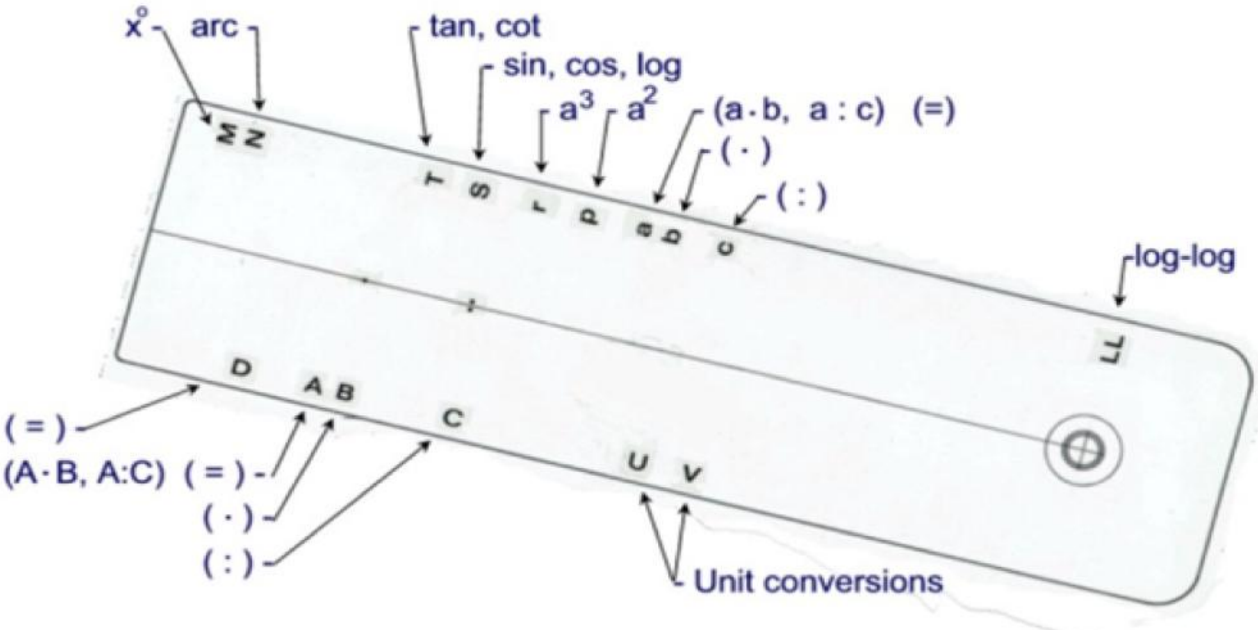
All examples illustrated are based as self-explained.

1.	3 · 5 = A B ▶	15 A
2.	3 : 5 = A C ▶	0.6 A
3.	0.03 · 5000 = A B ▶	150 A
4.	30 : 500 = A C ▶	0.06 A
5.	1.22 · 1.58 = a b ▶	1.928 a
6.	4.37 : 1.775 = a c ▶	2.46 a
7.	15000 · 200 = $0.03 \cdot 10^{8}$ = A B ▶ A	$3 \cdot 10^{6}$ D
8.	3 : 5000 = $60000 \cdot 10^{-8}$ = A C ▶ A	$6 \cdot 10^{-4}$ D
9.	7400 · 5% = A B ▶	370 A
10.	3.50 − 30% = a b ▶	2.45 a
11.	3.50 + 30% = a b ▶	4.55 a
12.	(3.50 − 25%) − 10% = a b c	2.36 a
13.	4 · 150 = X · 2000 A B A B	X= 0.3
14.	3 : 150 = 15 : X A C A C	X= 750
15.	30 · 5 · 40 = A B C	6000 A
16.	30 · 5 : 40 = A B B	3.75 A
17.	3 : 5 : 40 = A C B	0.015 A

18.	1 : 50 = B	0.020 C
19.	$68^{o}F = X^{o}C$ U V	$X= 20^{o}C$
20.	50 KG. = X LB. U V A C	X= 110 LB.
21.	3^{2} = a	9 p
22.	3^{3} = a	27 r
23.	$\sqrt[2]{3}$ = p	1.732 a
24.	$\sqrt[3]{3}$ = r	1.442 a
25.	$\sqrt[2]{3}$ · 5 = p b ▶	8.66 a
26.	$\sqrt[2]{3}$: 5 = p c ▶	0.346 a
27.	$\sqrt[3]{3}$ · 5 = r b ▶	7.21 a
28.	$(1.3 \cdot 2.5)^{2}$ = a b ▶	10.6 p
29.	$(1.3 \cdot 2.5)^{3}$ = a b ▶	34.3 r
30.	$^{10}\log 5$ = a	0.699 S
31.	$^{10}\log (1.3 \cdot 2.5)$ = a b ▶	0.512 S
32.	$^{10}\log (5 : 3)$ = a c ▶	0.222 S
33.	$\sin 50^{o}$ = M	0.766 S
34.	$\cos 40^{o}$ = M	0.766 S

35.	Tan 50^{o} = M	1.19 T
36.	Cot 40^{o} = M	1.19 T
37.	Arc-sin 0.350 = S	20.5^{o} M
38.	Arc-cos 0.350 = S	69.5^{o} M
39.	Arc-tan 0.350 = T	19.3^{o} M
40.	Arc-cot 0.350 = T	70.7^{o} M
41.	Arc 40^{o} = M	0.698 N
42.	1.20 rad = N	68.8^{o} M
43.	Sin 0.450rad = N	0.435 S
44.	Tan 1.30rad = N	3.60 T
45.	2^{5} = LL c ▷——	32 LL
46.	2^{50} = LL c ▷——	10^{15} LL
47.	$2^{0.5}$ = LL c ▷——	1.414 LL
48.	$\sqrt[4]{625}$ = LL b ▷——	5 LL
49.	$\sqrt[40]{625}$ = LL b ▷——	1.174 LL
50.	$\sqrt[400]{625}$ = LL b ▷——	1.0162 LL
51.	$^{e}\log 5$ = LL ▷—LL	1.61 c
52.	$^{e}\log 50$ = LL ▷—LL	3.91 c
53.	$^{e}\log 500$ = LL ▷—LL	6.21 c
54.	$^{3}\log 5$ = LL ▷—LL	1.465 c
55.	$^{4}\log 5$ = LL ▷—LL	1.16 c
56.	$^{8}\log 5$ = LL ▷—LL	0.774 c
57.	$4^{2\cdot 1.5}$ = LL b c	64 LL
58.	$4^{5/8}$ = LL c c	2.38 LL
59.	$^{2}\log 0.05 = -\,^{2}\log (1 : 0.05) = -\,^{2}\log 20 =$ B C LL ▷—LL	-4.32 c
60.	$0.2^{5} = 1 : (1 : 0.2)^{5} = 1 : 5^{5} = 1 : 3100 =$ B C LL c ▷—— LL B	0.00032 C
61.	$\sqrt[4]{0.4} = 1 : \sqrt[4]{1:0.4} = 1 : \sqrt[4]{2.5} = 1 : 1.257 =$ B C b LL ▷—— LL b	0.796 c

SLIDE RULE RUNNER



The runner is your guide for calculations.
On the runner you find letters that will indicate and locate all scales.
Those letters appear below each number, in every illustrated example.
This way you will find for every number the correct scale.

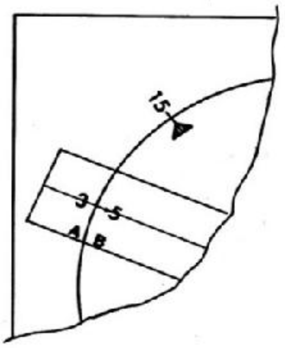
Der Läufer ist Ihr Wegweiser für die Berechnungen.
Sie finden auf dem Läufer Buchstaben, die die darunterliegenden Skalen bezeichnen. Dieselben Buchstaben stehen unter jeder Zahl in den gezeigten Beispielen. So finden Sie für jede Zahl sofort die richtige Skala.

Le curseur est votre guide pour les calculations.
Sur le curseur vous remarquez des lettres indiquant les échelles en dessous. Les mêmes lettres sont marquées sous chaque chiffre dans les exemples illustrés. Ainsi vous trouvez pour chaque chiffre immédiatement l'échelle correspondante.

Il cursore è una guidá sicura per i Vostri calcoli.
Sul cursore sono riportate delle lettere che indicano le differenti scale e le loro rispettive posizioni.
Queste lettere sono riportate sotto ogni numero negli esempi illustrativi.
Non vi è pericolo di sbagliare, per ogni numero troverete la scala esatta.

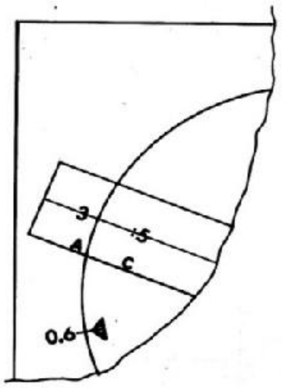
El cursor le servirá de guía en los cálculos.
En el cursor encontrará letras que designan las escalas e indican su emplazamiento.
Estas letras se encuentran debajo de las cifras en cada ejemplo ilustrado.
De esta manera encontrará la escala adecuada para cada cantidad.

Löparen är Er vägvisare för beräkningarna.
På löparen hittar Ni bokstäver som betecknar skalorna och angiver deras placering. Dessa bokstäver finns angivna under talen i varje illustrerat exempel. På detta sätt hittar Ni för varje tal den rätta skalan.



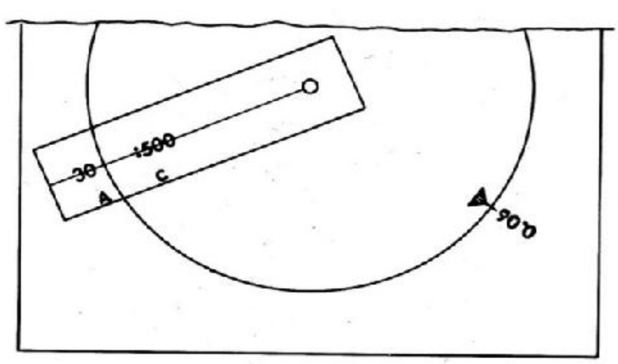
① $3 \cdot 5 = 15$
A B ▶ A

Ex. $6 \cdot 5 =$



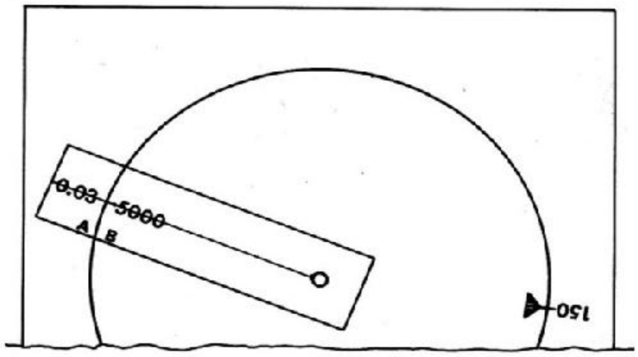
② $3 : 5 = 0.6$
A C ▶ A

Ex. $150 : 30 =$



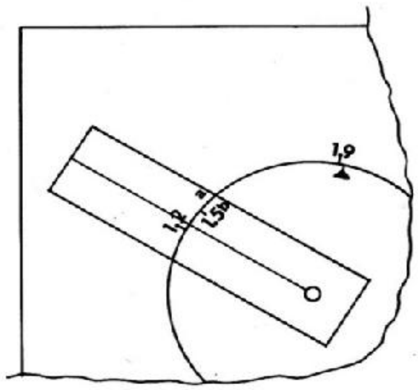
④ $30 : 500 = 0.06$
A C ▶ A

Ex. $20 : 25 =$



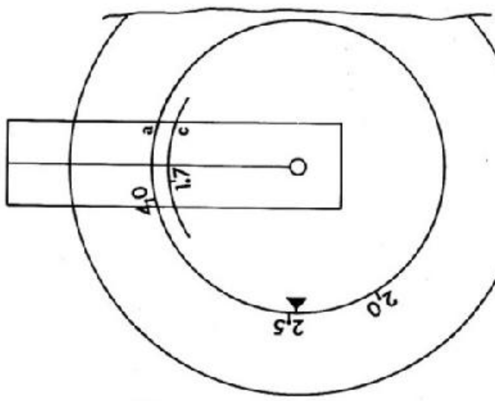
③ $0.03 \cdot 5000 = 150$
A B ▶ A

Ex. $400 \cdot 0.06 =$



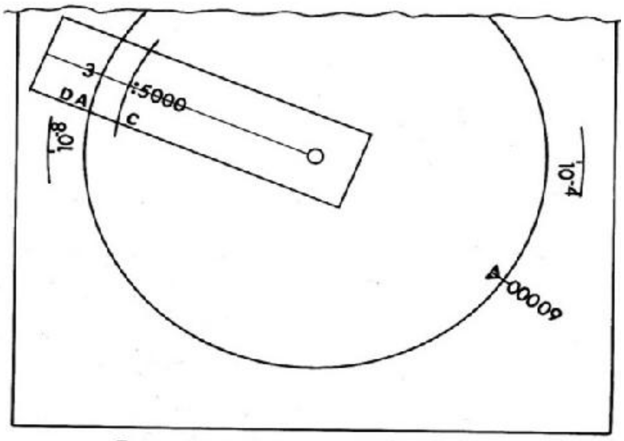
⑤ $1.22 \cdot 1.58 = 1.928$
a b ▶ a

Ex. $4.7 \cdot 2.5 =$



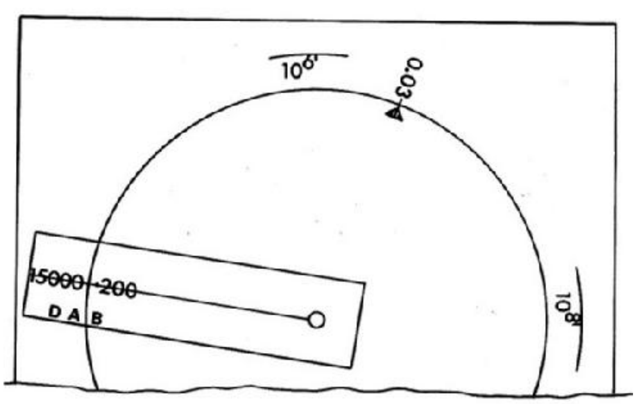
⑥ $4.37 : 1.775 = 2.46$
a c ▶ a

Ex. $8.4 : 1.91 =$



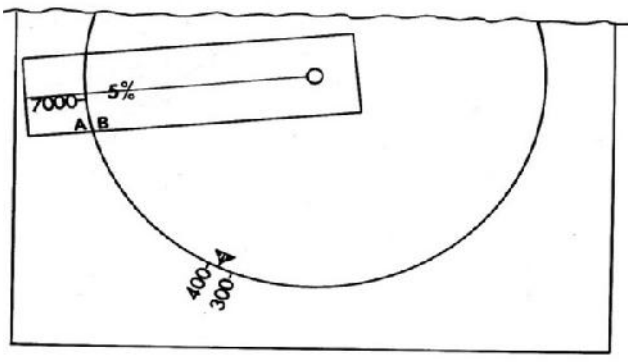
⑧ $3 : 5000 = 60000 \cdot 10^{-8} = 6 \cdot 10^{-4}$
A C ▶ A D

Ex. $2 : 8000 =$



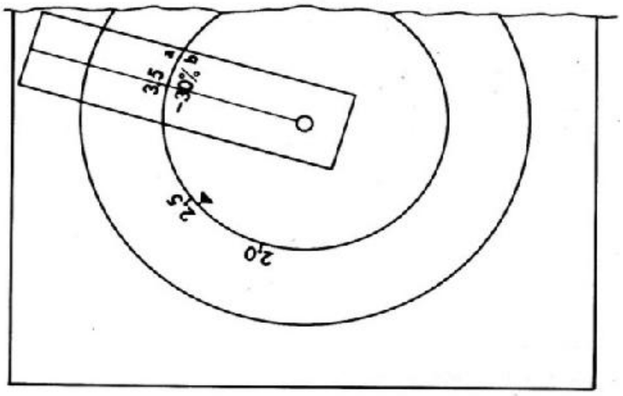
⑦ $15000 \cdot 200 = 0.03 \cdot 10^8 = 3 \cdot 10^6$
A B ▶ A D

Ex. $500000 \cdot 4000 =$



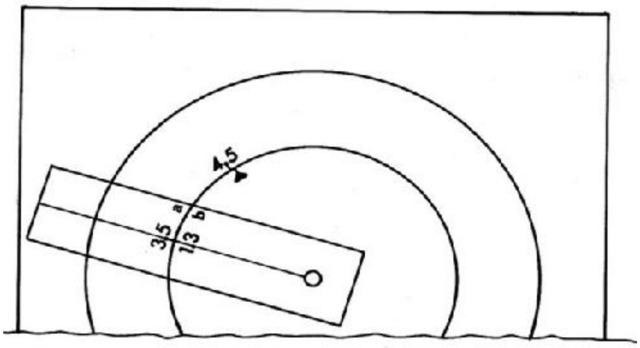
⑨ $7400 \cdot 5‰ = 370$
A B ▶ A

Ex. $450 \cdot 2‰ =$



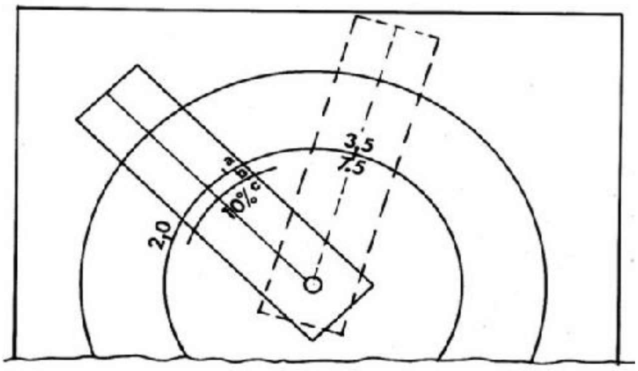
⑩ 3.50 - 30°/ₒ = 2.45
a b ▶a

Ex. 7.80 - 50°/ₒ =



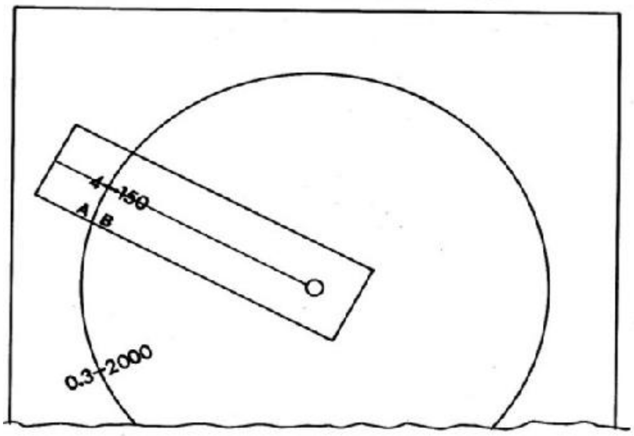
⑪ 3.50 + 30°/ₒ = 4.55
a b ▶a

Ex. 2.20 + 1/3 =



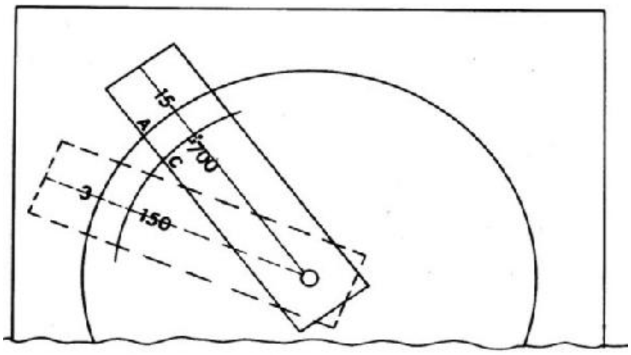
⑫ 3.50 - 25°/ₒ - 10°/ₒ = 2.36
a b c a

Ex. 6.20 - 20°/ₒ - 30°/ₒ =



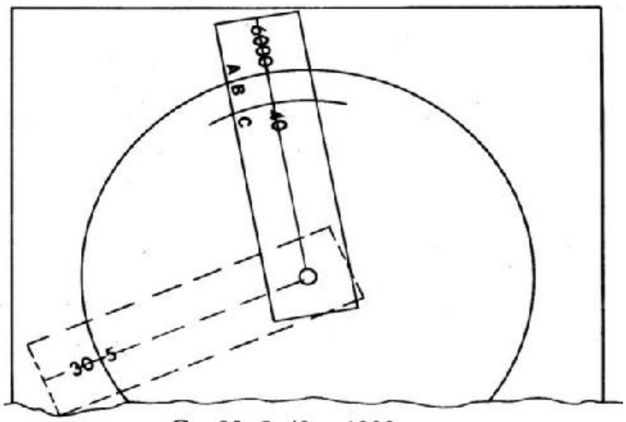
⑬ 4 · 150 = X · 2000 X = 0.3
A B A B

Ex. 15 · 40 = X · 3 X =



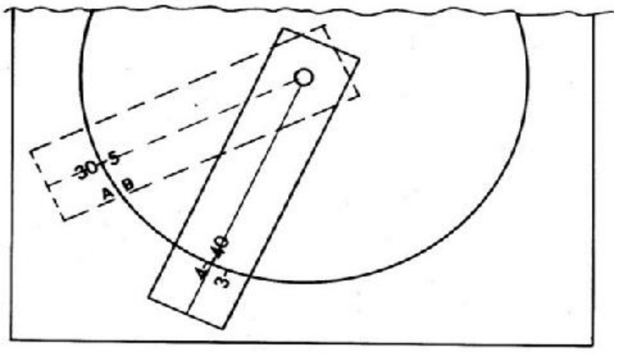
⑭ 3 : 150 = 15 : X X = 750
A C A C

Ex. 60 : 0.20 = 150 : X X =



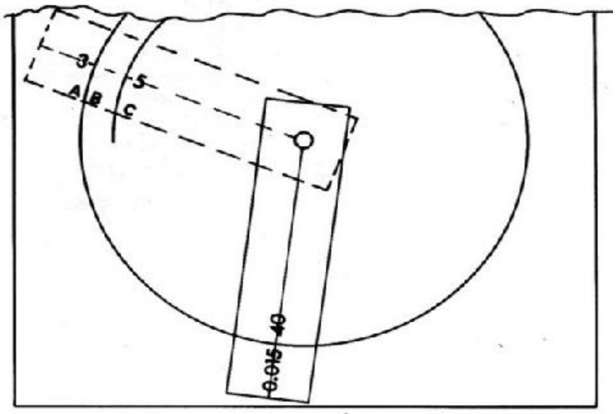
⑮ 30 · 5 · 40 = 6000
A B C A

Ex. 25 · 7 · 4 =



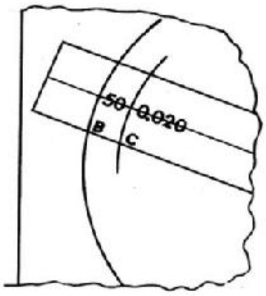
⑯ 30 · 5 : 40 = 3.75
A B B A

Ex. 15 · 6 : 30 =



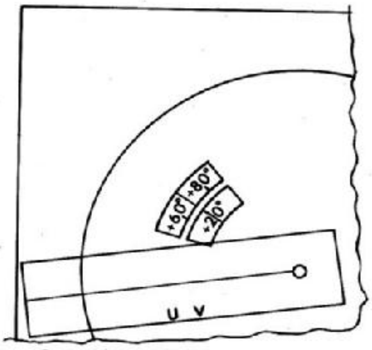
⑰ 3 : 5 : 40 = 0.015
A C B A

Ex. 90 : 5 : 9 =



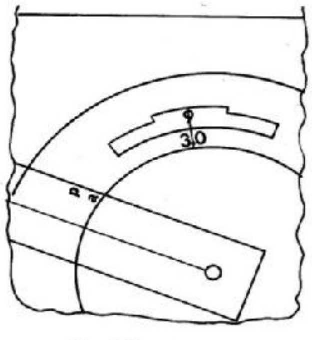
⑱ $1:50 = 0.020$
B C

Ex. $1:20 =$



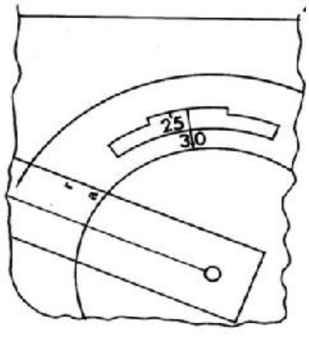
⑲ $68\,°F = X\,°C \quad X = 20\,°C$
U V

Ex. $86\,°F = X\,°C \quad X =$



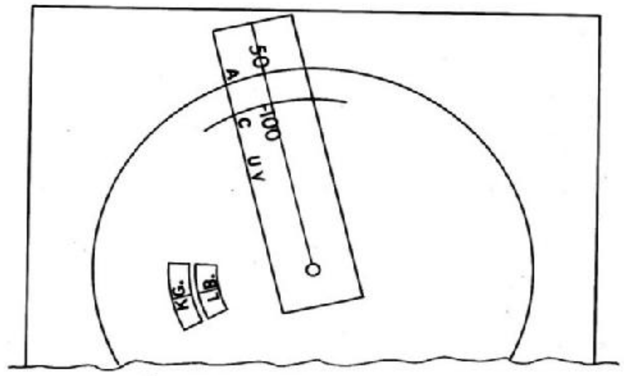
㉑ $3^2 = 9$
a p

Ex. $5^2 =$



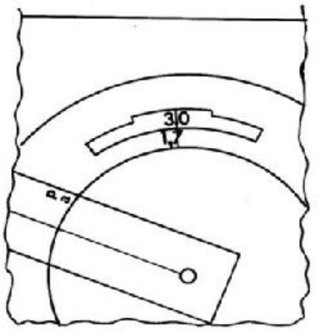
㉒ $3^3 = 27$
a r

Ex. $5^3 =$



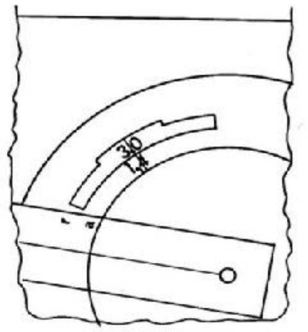
⑳ 50 kg = X lb X = 110 lb
U V

Ex. 6.1 m = X ft X =



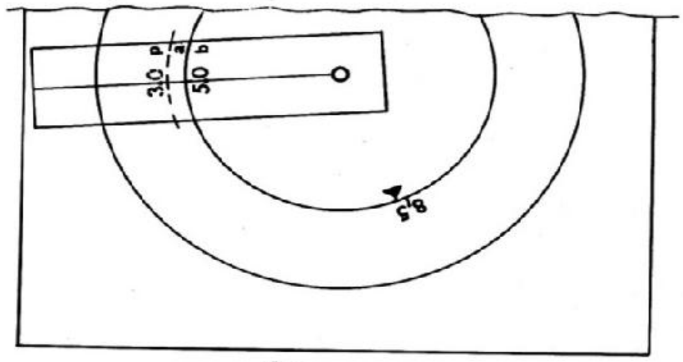
㉓ $\sqrt[2]{3} = 1.732$
p a

Ex. $\sqrt[2]{6} =$



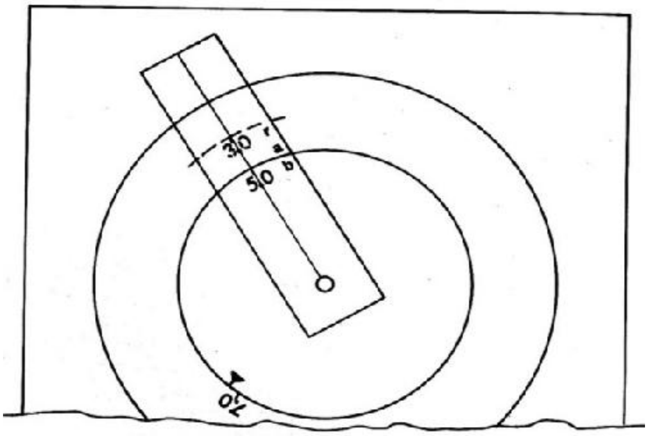
㉔ $\sqrt[3]{3} = 1.442$
r a

Ex. $\sqrt[3]{21} =$



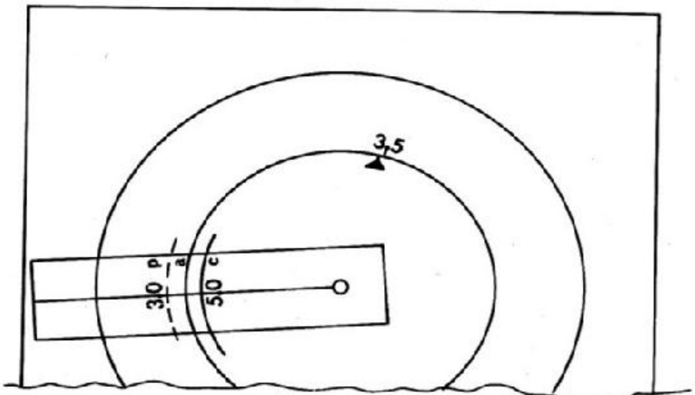
㉕ $\sqrt[2]{3} \cdot 5 = 8.66$
p b ▶ a

Ex. $\sqrt[2]{6} \cdot 4 =$



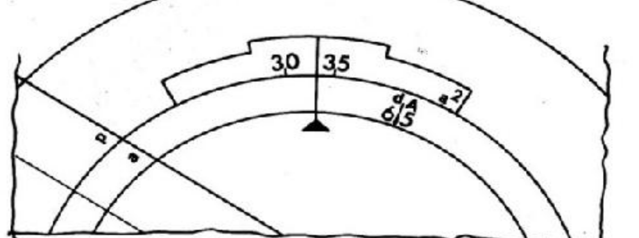
㉗ $\sqrt[3]{3} \cdot 5 = 7.21$
r b ▶ a

Ex. $\sqrt[3]{6} \cdot 3 =$

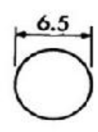


㉖ $\sqrt[2]{3} : 5 = 0.346$
p c ▶ a

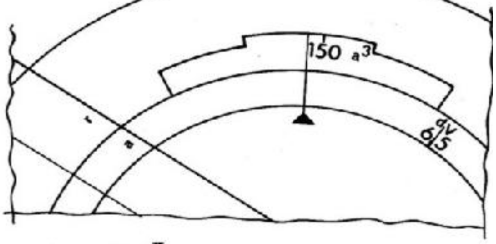
Ex. $\sqrt[2]{6} : 1.4 =$



㉘ $\frac{\pi}{4} \cdot 6.5^2 = 33.2$
d_A ▶ p



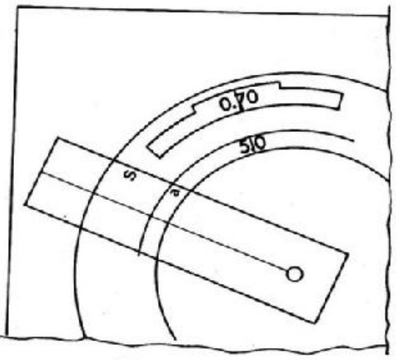
Ex. $\frac{\pi}{4} \cdot 3.5^2 =$



㉙ $\frac{\pi}{6} \cdot 6.5^3 = 144$

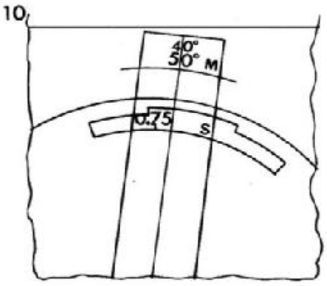
d_V ▶ r

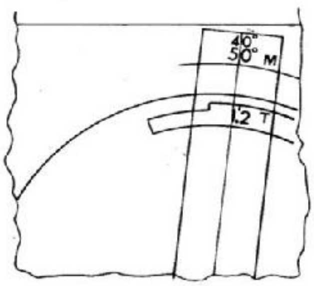
Ex. $\frac{\pi}{6} \cdot 3.5^3 =$



㉚ ${}^{10}\log 5 = 0.699$
a S

Ex. ${}^{10}\log 7 =$





㉝ Sin 50° = 0.766
M S

Ex. Sin 65° =

㉞ Cos 40° = 0.766
M S

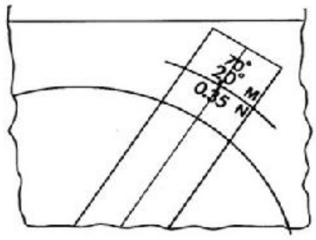
Ex. Cos 25° =

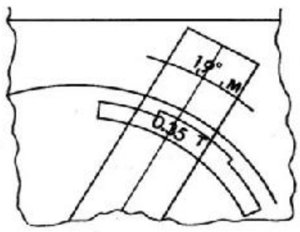
㉟ Tan 50° = 1.19
M T

Ex. Tan 65° =

㊱ Cot 40° = 1.19
M T

Ex. Cot 25° =





㊲ Arc-sin 0.350 = 20.5°
S M

Ex. Arc-sin 0.810 =

㊳ Arc-cos 0.350 = 69.5°
S M

Ex. Arc-cos 0.810 =

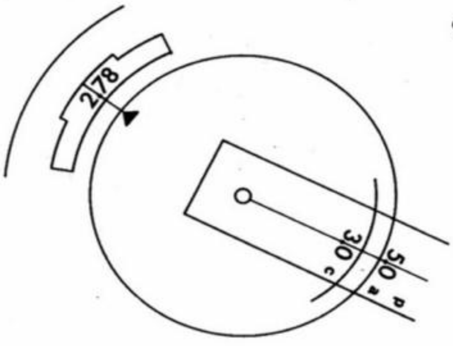
㊴ Arc-tan 0.350 = 19.3°
T M

Ex. Arc-tan 0.810 =

㊵ Arc-cot 0.350 = 70.7°
T M

Ex. Arc-cot 0.810 =

9



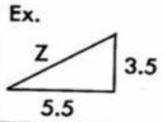
$\sqrt{\left(\frac{4}{3}\right)^2 + 1} = 5$

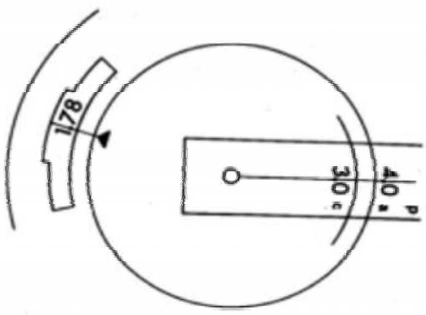
▶ p

▶ (p + 1)

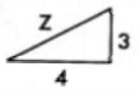
a

Ex.

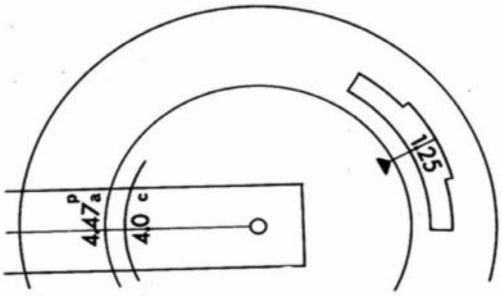




㉛ $Z = \sqrt{4^2 + 3^2} = 3$
a c



c



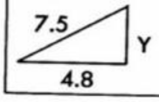
$\sqrt{\left(\frac{6}{4}\right)^2 - 1} = 4.47$

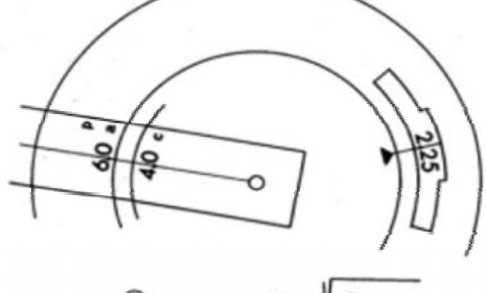
▶ p

▶ (p − 1)

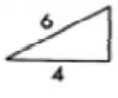
a

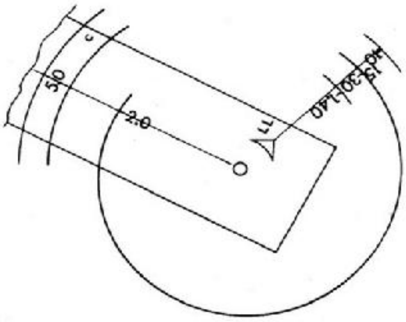
Ex.





㉜ $Y = \sqrt{6^2 - 4^2} = 4$
a c



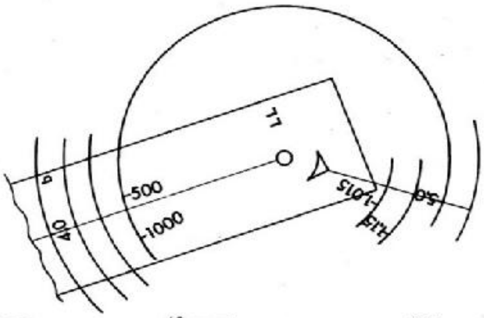


(45) $2^5 = 32$
LL c ▷—LL

(46) $2^{50} = 10^{15}$
LL c ▷—LL

(47) $2^{0.5} = 1.414$
LL c ▷—LL

Ex. $3^2 =$	Ex. $3^{20} =$	Ex. $3^{0.2} =$



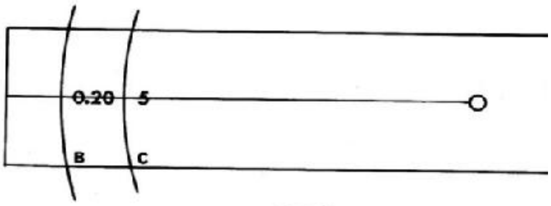
(48) $\sqrt[4]{625} = 5$
LL
b ▷—LL

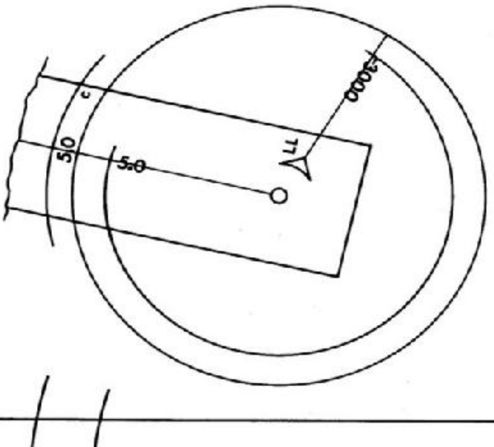
(49) $\sqrt[40]{625} = 1.174$
LL
b ▷—LL

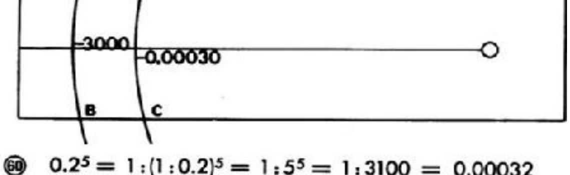
(50) $\sqrt[400]{625} = 1.0162$
LL
b ▷—LL

Ex. $\sqrt[3]{150} =$	Ex. $\sqrt[30]{150} =$	Ex. $\sqrt[300]{150} =$

14

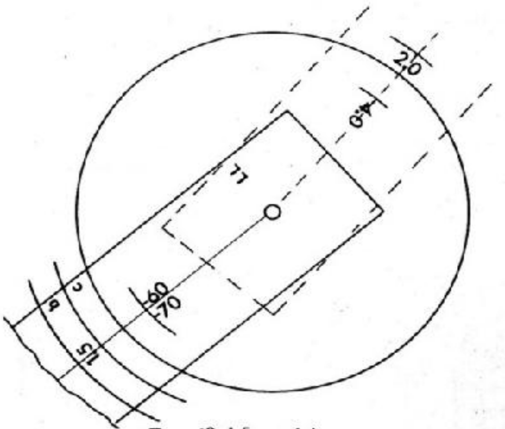






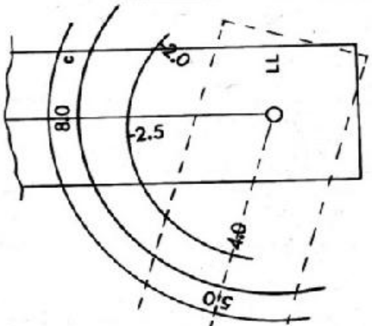
(60) $0.2^5 = 1:(1:0.2)^5 = 1:5^5 = 1:3100 = 0.00032$
B C
LL c ▷— LL
B C

Ex. $0.4^4 =$



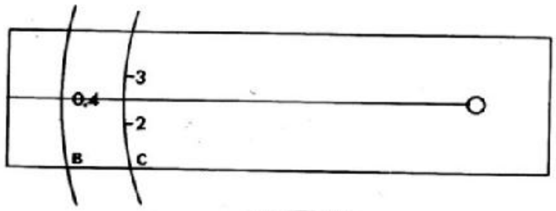
(57) $4^{2 \cdot 1.5} = 64$
LL c
b LL

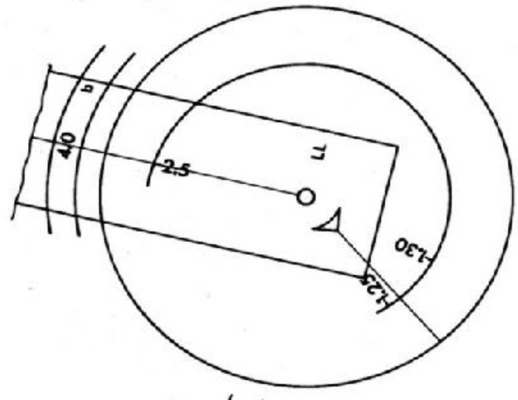
Ex. $2^{2 \cdot 4} =$

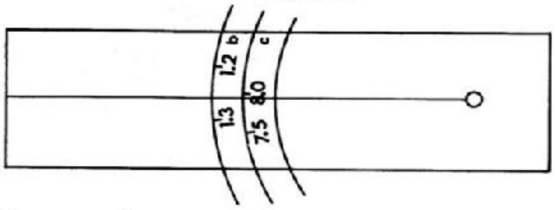


(58) $4^{5/8} = 2.38$
LL c
c LL

Ex. $7^{3/4} =$





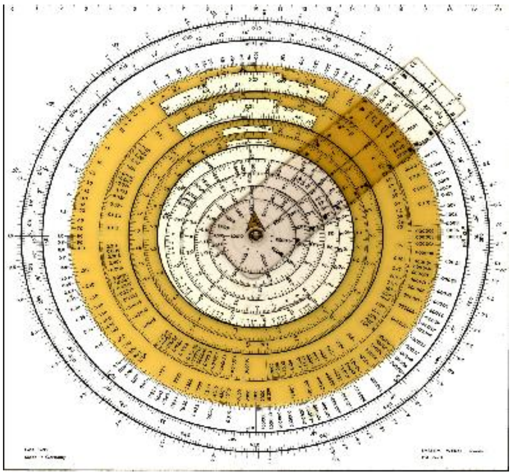


(61) $\sqrt[4]{0.4} = 1:\ \sqrt[4]{1:0.4} = 1:\ \sqrt[4]{2.5} = 1:1.257 = 0.796$
B C
b LL ▷— LL
b c

Ex. $\sqrt[9]{0.5} =$

CONVERSION SCALES

A	A (window)	C	C (window)			
0.0164	LIT.	= 1	CU.IN.	Liter	=	Cubic inch
0.0254	MM.	= 1	MIL	Millimeter	=	1/1000 inch
0.0283	CU.MET.	= 1	CU.FT.	Cubic meter	=	Cubic foot
0.0703	KG./SQ.CM.	= 1	LB./SQ.IN.	Kilogram/cm^2	=	Pound/inch^2
0.0929	SQ.MET.	= 1	SQ.FT.	Square meter	=	Square foot
0.1383	KG.MET.	= 1	FT.LB.	Kilogram-meter	=	Foot-pound
0.2520	KCAL.	= 1	BTU.	Kilo-calorie	=	British Thermal Unit
0.3048	MET.	= 1	FT.	Meter	=	Foot
0.4536	KG.	= 1	LB.	Kilogram	=	Pound
0.0555	^{o}K	= 1	^{o}RANK	Kelvin	=	Rankine
0.8	^{o}REAU.	= 1	^{o}C	Réaumur	=	Celsius
0.9144	MET.	= 1	YD.	Meter	=	Yard
1.6093	KM.	= 1	ST.MILE	Kilometer	=	Statute mile
1.8532	KM.	= 1	NT.MILE	Kilometer	=	Nautical mile
2.54	CM.	= 1	IN.	Centimeter	=	Inch
3.7853	LIT.	= 1	US.GAL.	Liter	=	US gallon
4.546	LIT.	= 1	BR.GAL.	Liter	=	British gallon
6.4516	SQ.CM.	= 1	SQ.IN.	Square centimeter	=	Square inch
9.8067	WATT	= 1	KG.MET/S.	Watt	=	Kilogram-meter/sec
16.387	CU.CM.	= 1	CU.IN.	Cubic-centimeter	=	Cubic inch
28.35	GRAM	= 1	OZ.	Gram	=	Ounce
36.00	KM./H.	= 1	MET./0.1 S.	Kilometer/hour	=	Meter/0.1 second
68.1818	MPH.	= 1	FT./0.01 S.	Miles per hour	=	Foot/0,01 second
107.514	KG.MET.	= 1	BTU.	Kilogram-meter	=	British Thermal Unit
367.098	KG.MET.	= 1	WATT-HOUR	Kilogram-meter	=	Watt-hour
426.65	KG.MET.	= 1	KCAL.	Kilogram-meter	=	Kilo-calorie
907.18	KG.	= 1	US.SH.TON	Kilogram	=	US short ton
1016.0	KG.	= 1	BR.LG.TON	Kilogram	=	British long ton
2831.67	LIT.	= 1	REG.TON	Liter	=	Register ton
4046.9	SQ.MET.	= 1	ACRE	square meter	=	Acre
	^{o}F	=	1.8 ^{o}C + 32	Fahrenheit	=	Celsius



System Wern Slide Rule Prototype. **IWA 1633.**

Slide Rule Reference

Oughtred Society, Roseville, California, USA. www.oughtred.org

International Slide Rule Museum, Denver Colorada, USA. www.sliderulemuseum.com

National Museum of American History. http://americanhistory.si.edu/collections/object-groups/slide-rules

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