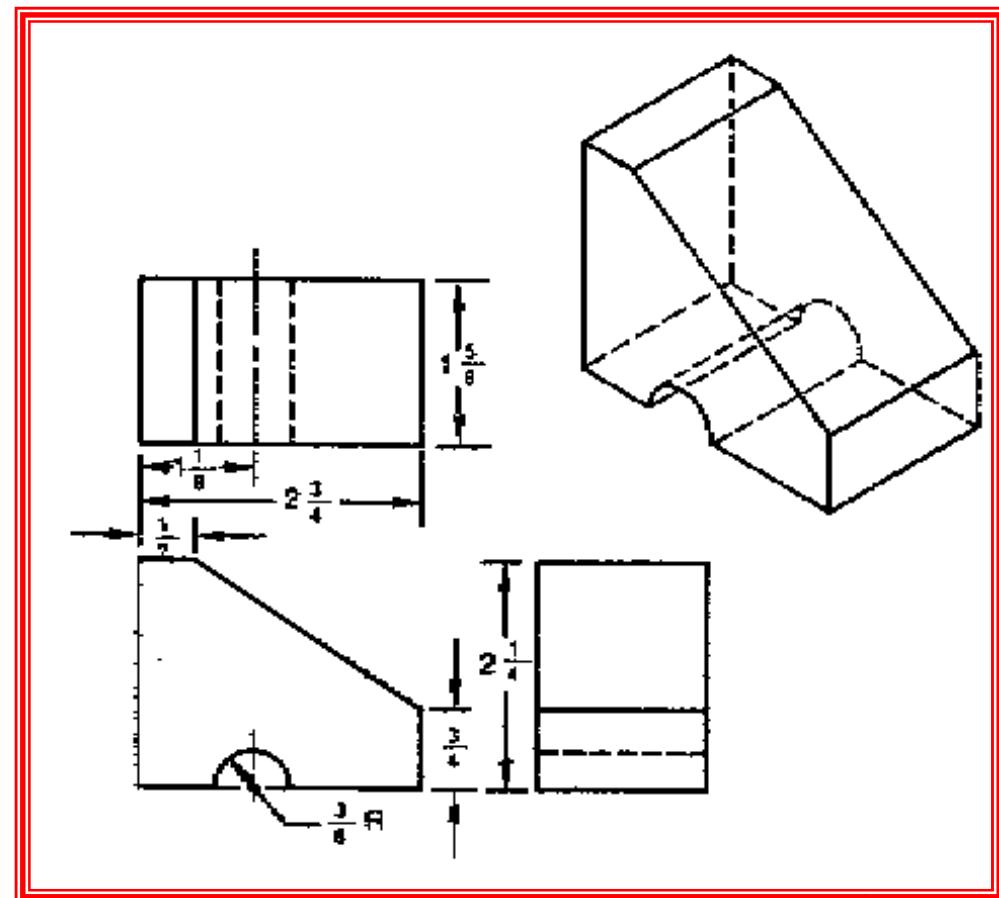
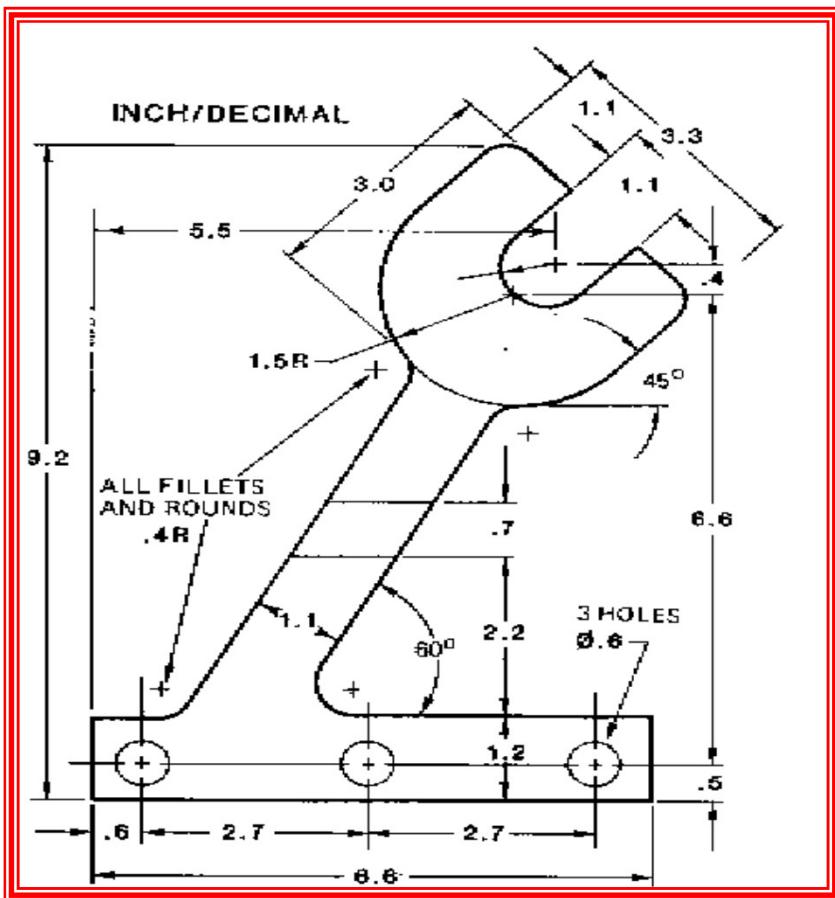


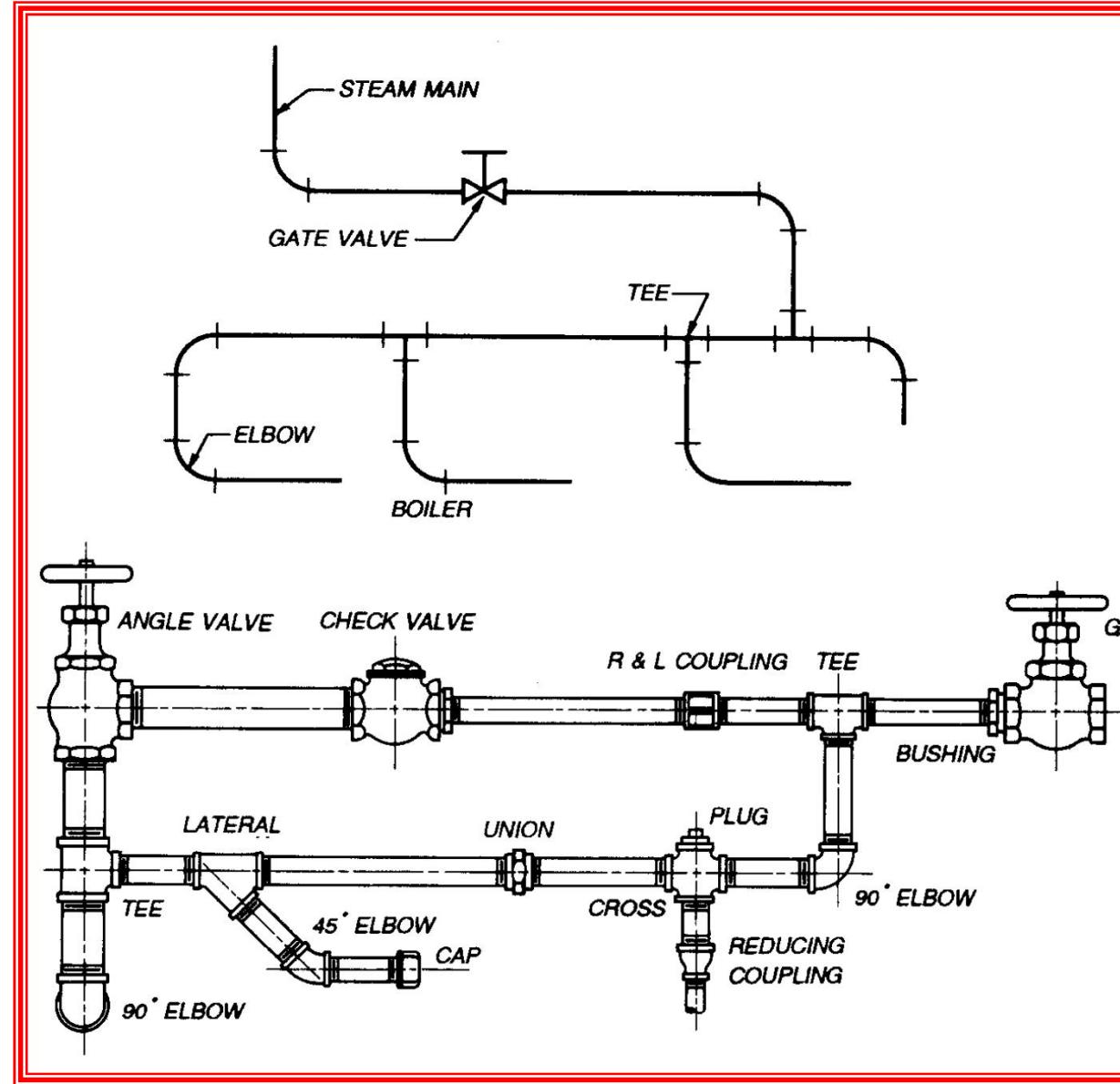
ลักษณะของงานเขียนแบบ

แบบภาพสองมิติ

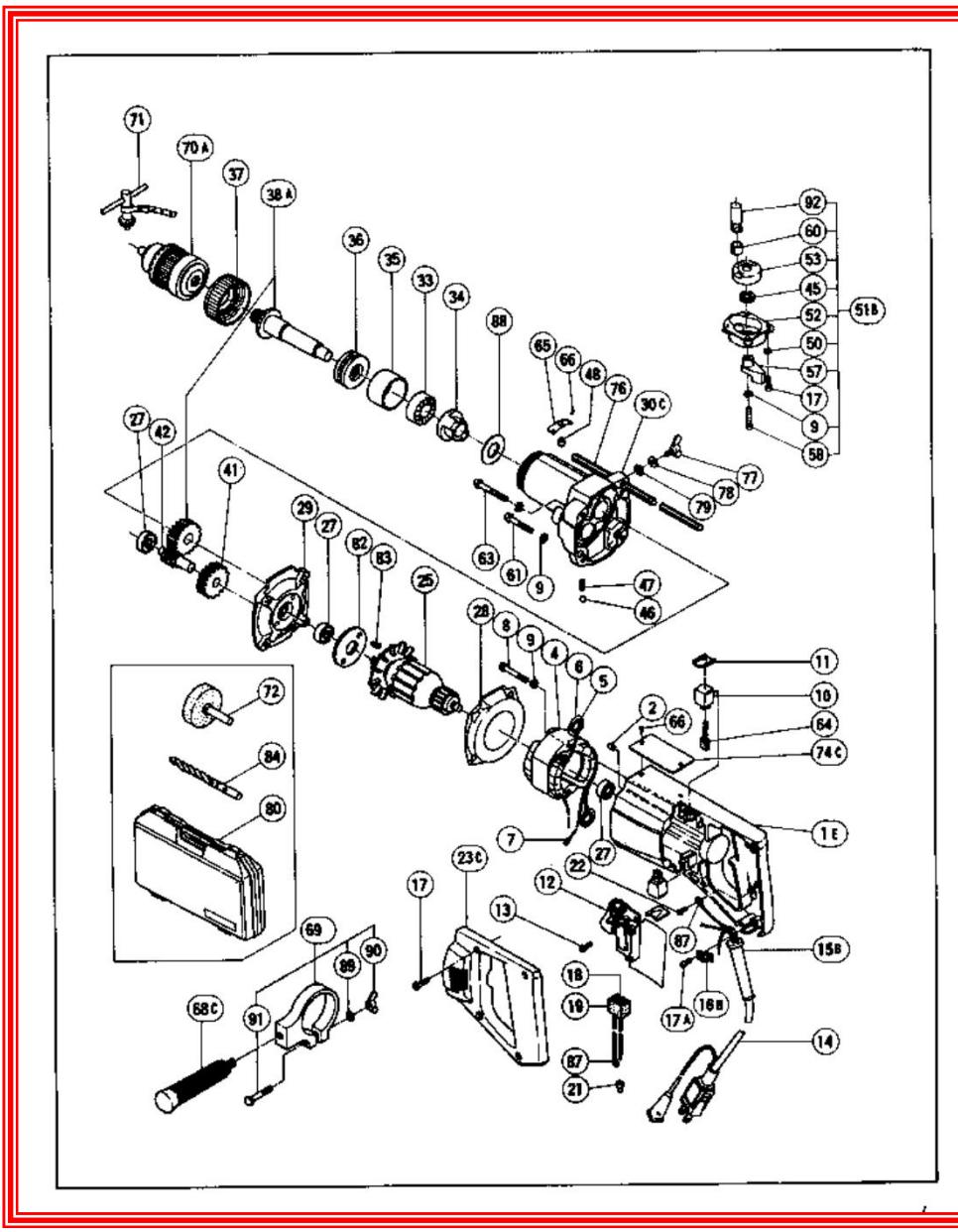
แบบภาพสามมิติ Pictorial Drawing
แบบภาพฉาย Orthographic Drawing

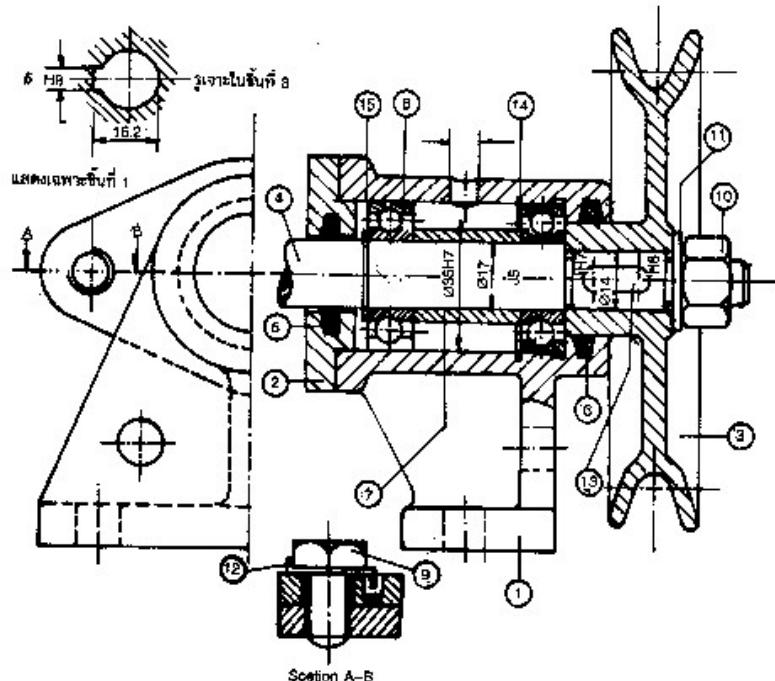


ແບບກາພສັນລັກຜົນ Symbols Drawing



ແບບເທິດນິກກາຮປະກອນ Illustration or Assemble Drawing





Section A-B

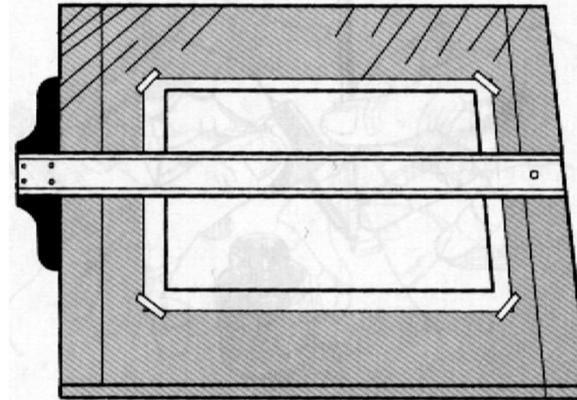
15	Lock Washer 17x1		Spring steel	DIN 471	1
14	Lock Washer 35x1.5		Spring steel	DIN 472	1
13	Parallel Pin A5x3x15		St. 60	DIN 6805	1
12	Lock Plate 10.5		St. VII 23	DIN 432	2
11	Washer 2/13		St.	DIN 125	1
10	Hexagon Nut M12		5.8	DIN 934	1
9	Hexagon Bolt M10x15		5.8	DIN 933	2
8	Deep Groove Ball Bearing			DIN 6205	2
7	Bush		St. 30		1
6	Seal 5x5x100		Felt		1
5	Seal 5x5x70		Felt		1
4	Shaft		S 60		1
3	Rope Pulley		GG-22		1
2	Cover		GG 18		1
1	Bearing Housing		GG 18		1
จำนวน	รายการ	หน่วยนับ	จำนวน	รายการ	จำนวน
จำนวน				จำนวนไม่รวมในเบื้องต้นของ	
จำนวน				วิธีการซ่อมแซมทั่วไป	
จำนวน M.11.					
จำนวนแม่พิมพ์					
หมายเหตุ	ระบุที่หน้ารูป			หมายเหตุ	
1:1	Rope Pulley Support			DE 00	

เครื่องมือและอุปกรณ์เขียนแบบ / Drawing Instruments

โต๊ะเขียนแบบ



T-SQUARE AND BOARD



DRAFTING MACHINE



ດិនសោ

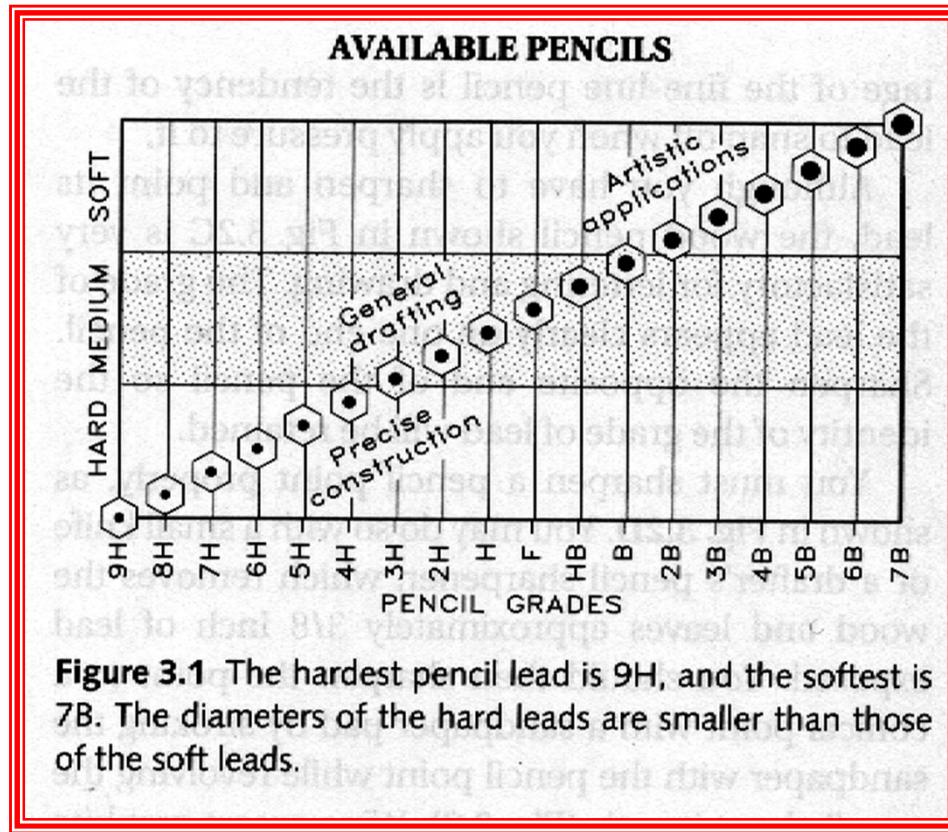
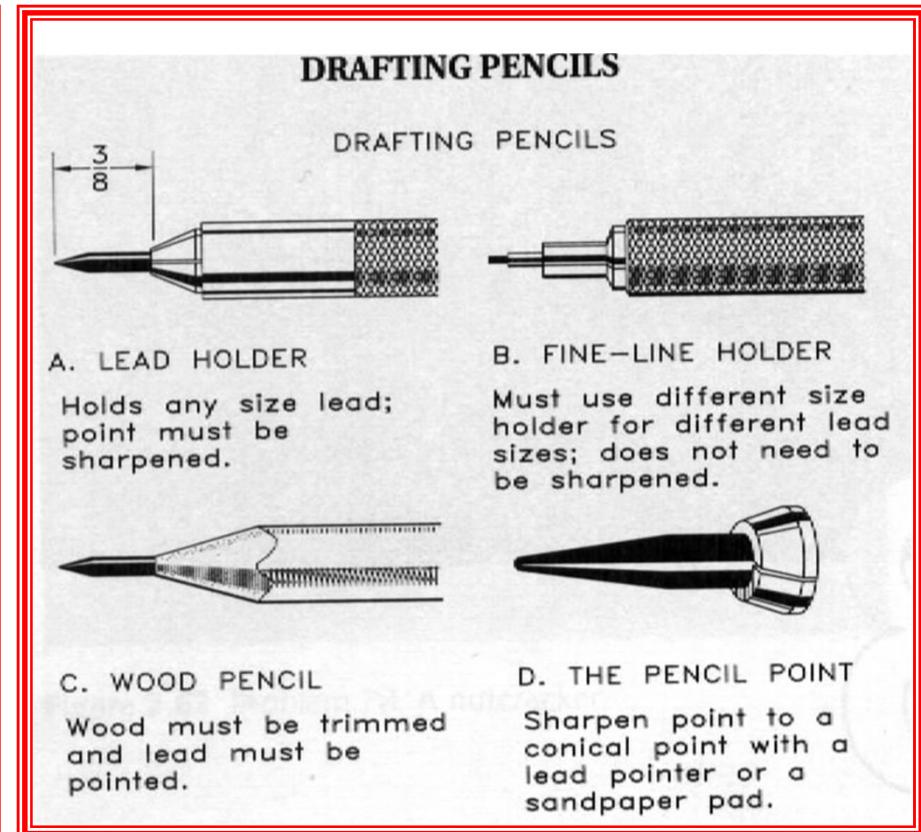
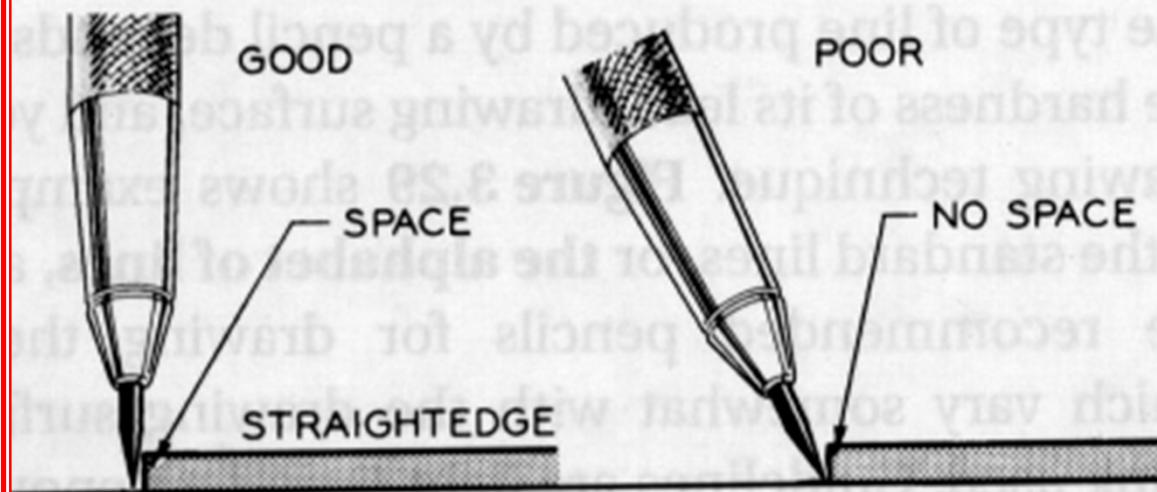


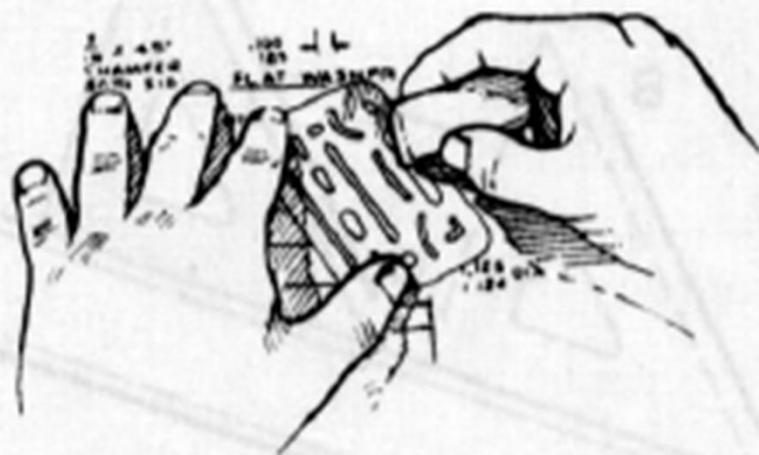
Figure 3.1 The hardest pencil lead is 9H, and the softest is 7B. The diameters of the hard leads are smaller than those of the soft leads.

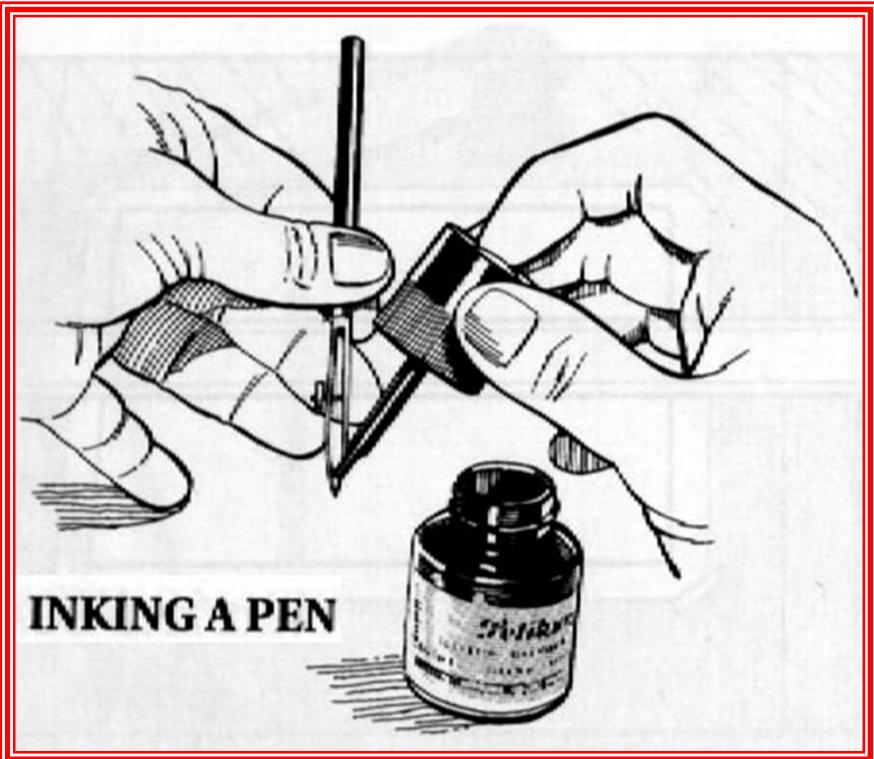


PENCIL POSITION

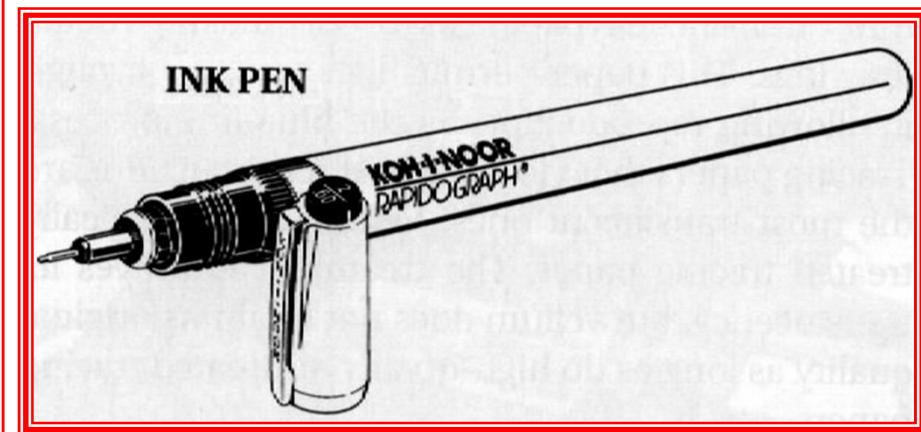


ERASING SHIELD

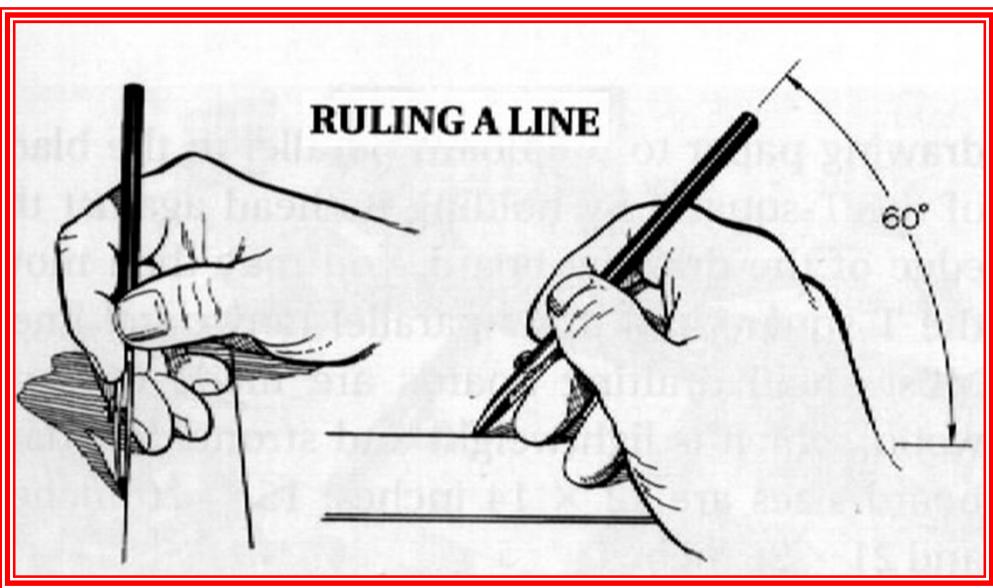




INKING A PEN

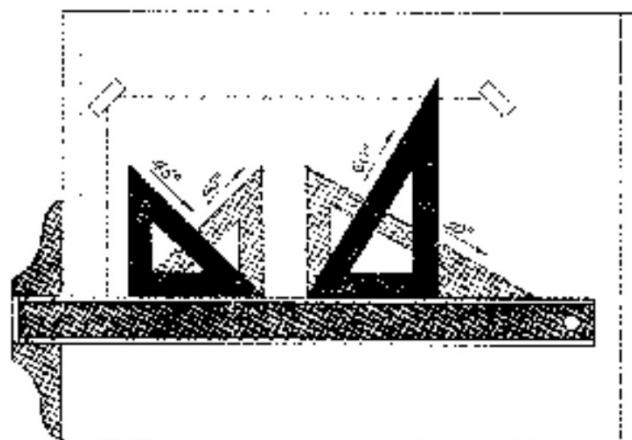
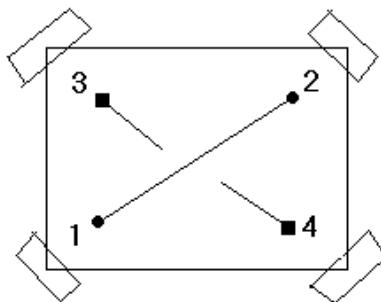


INK PEN



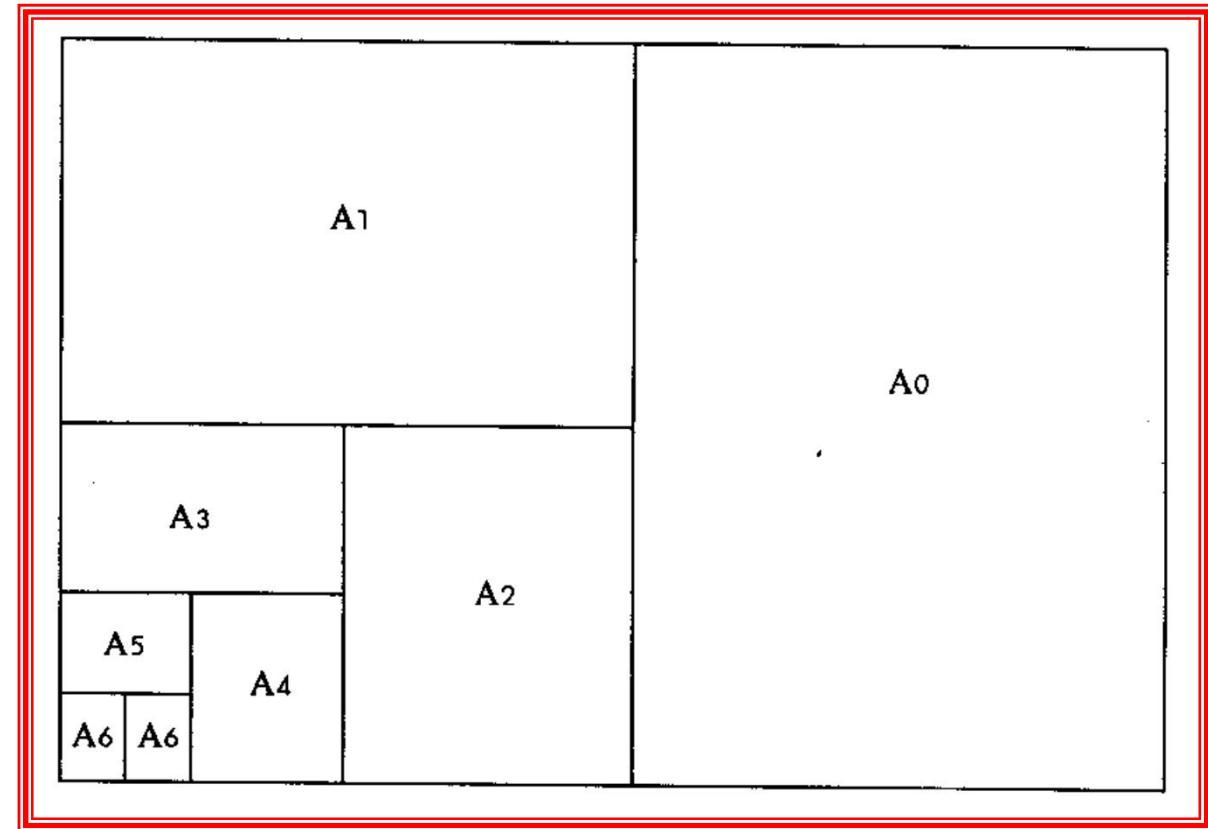
RULING A LINE

กระดาษ

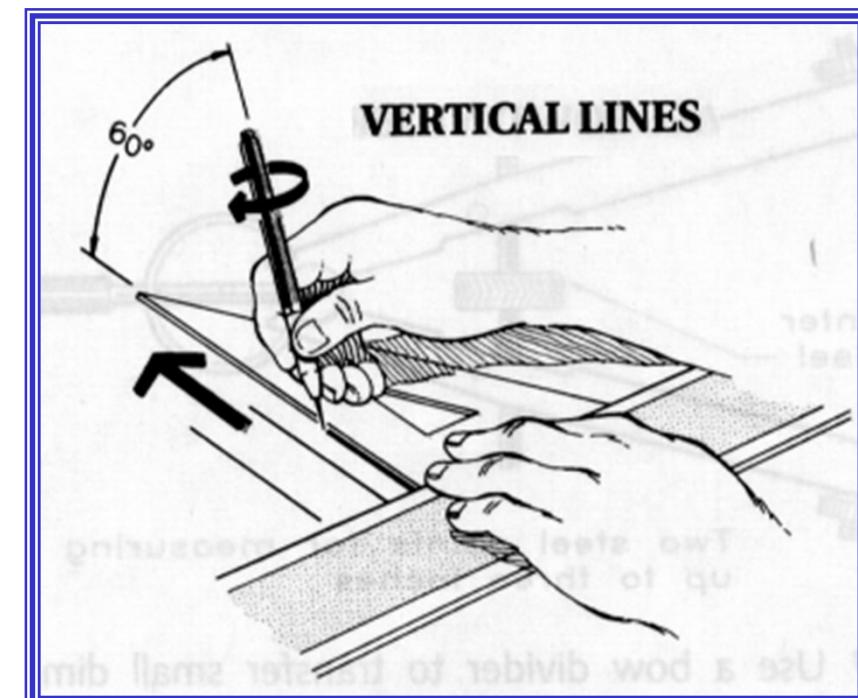
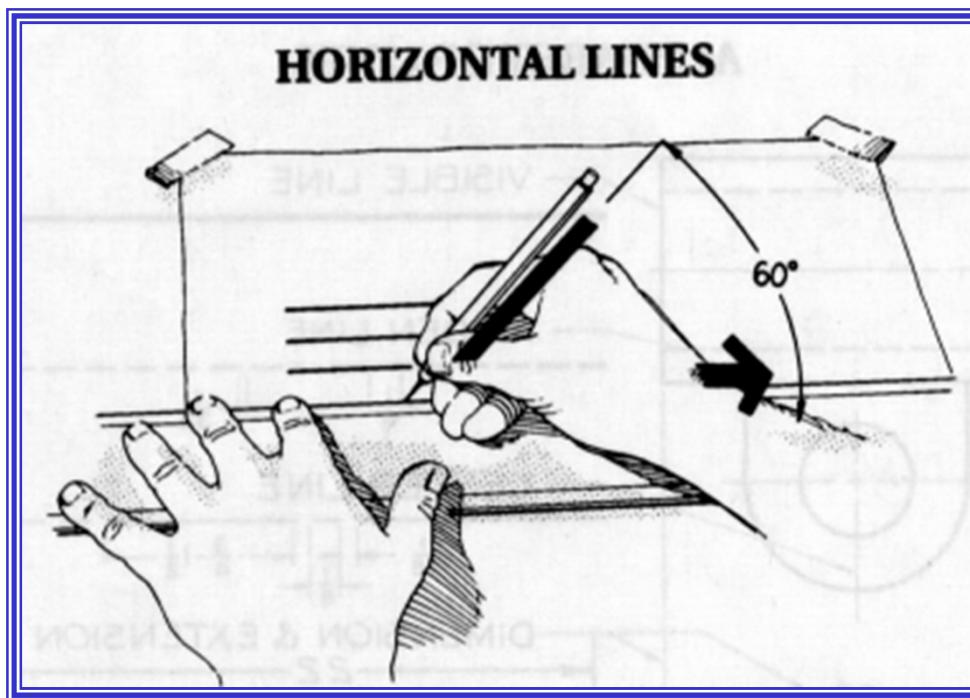
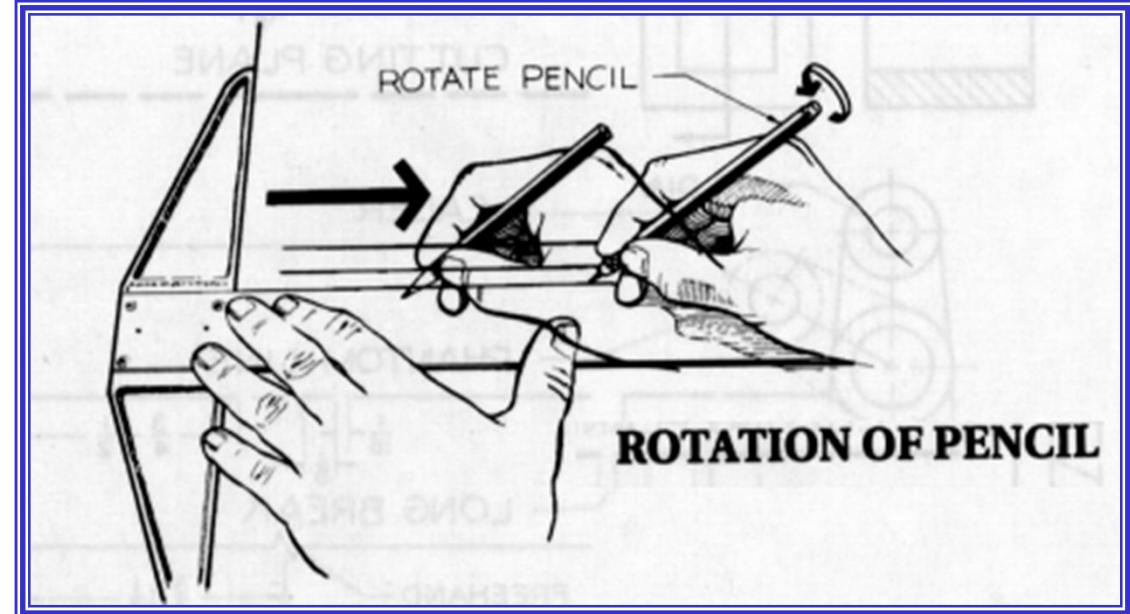


DRAFTING SHEET SIZES

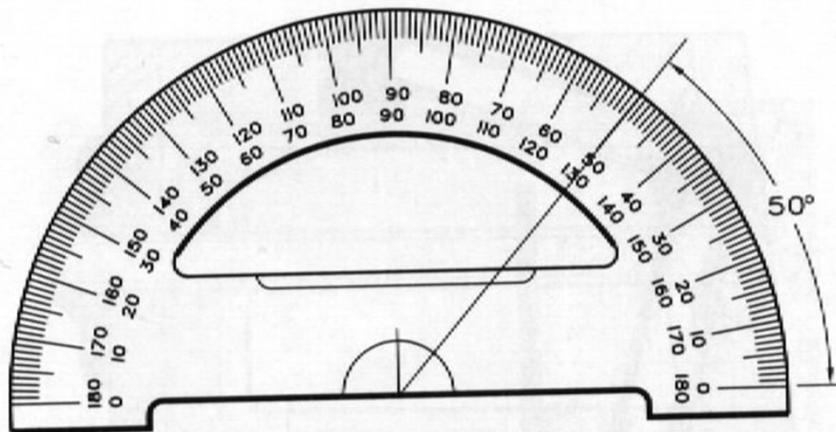
	ENGINEERS'	ARCHITECTS'	METRIC
A	11" X 8.5"	12" X 9"	A4 297 X 210
B	17" X 11"	18" X 12"	A3 420 X 297
C	22" X 17"	24" X 18"	A2 594 X 420
D	34" X 22"	36" X 24"	A1 841 X 594
E	44" X 34"	48" X 36"	A0 1189 X 841



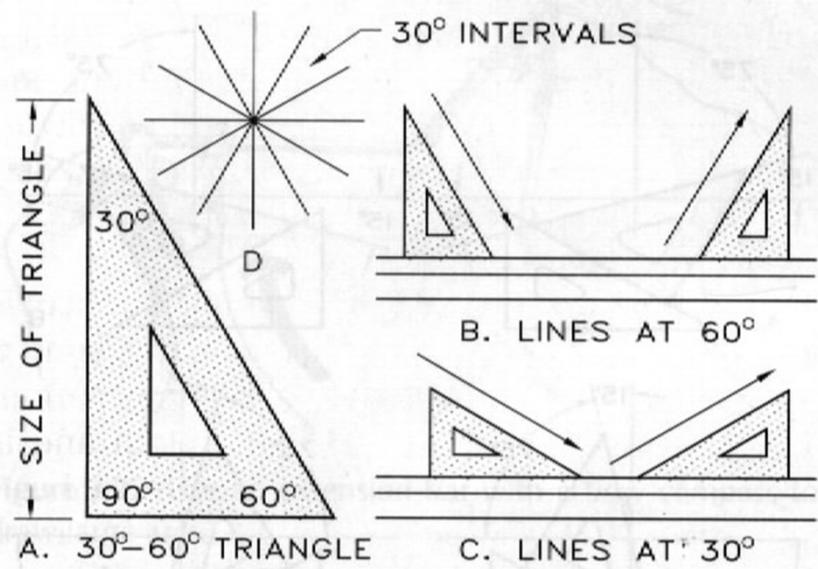
การเขียนเส้นตรง



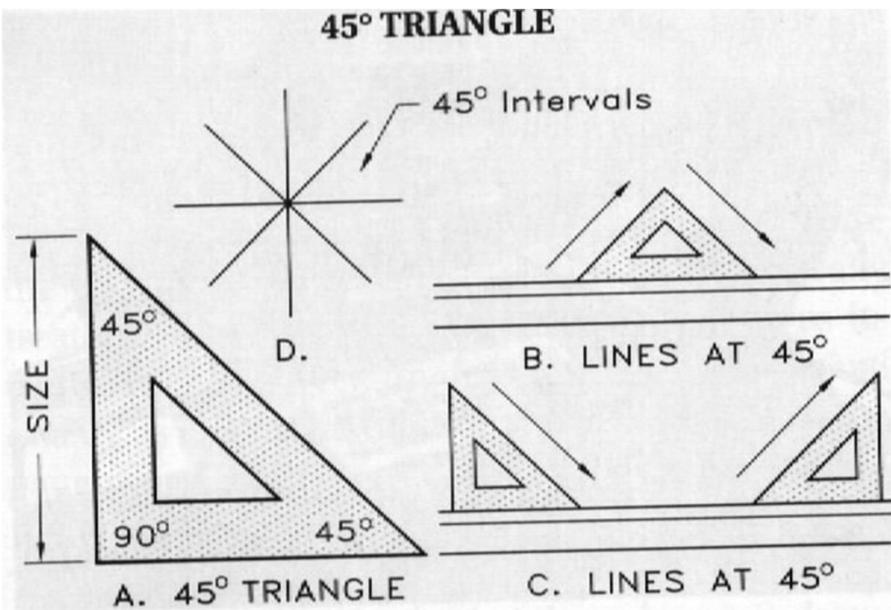
THE PROTRACTOR



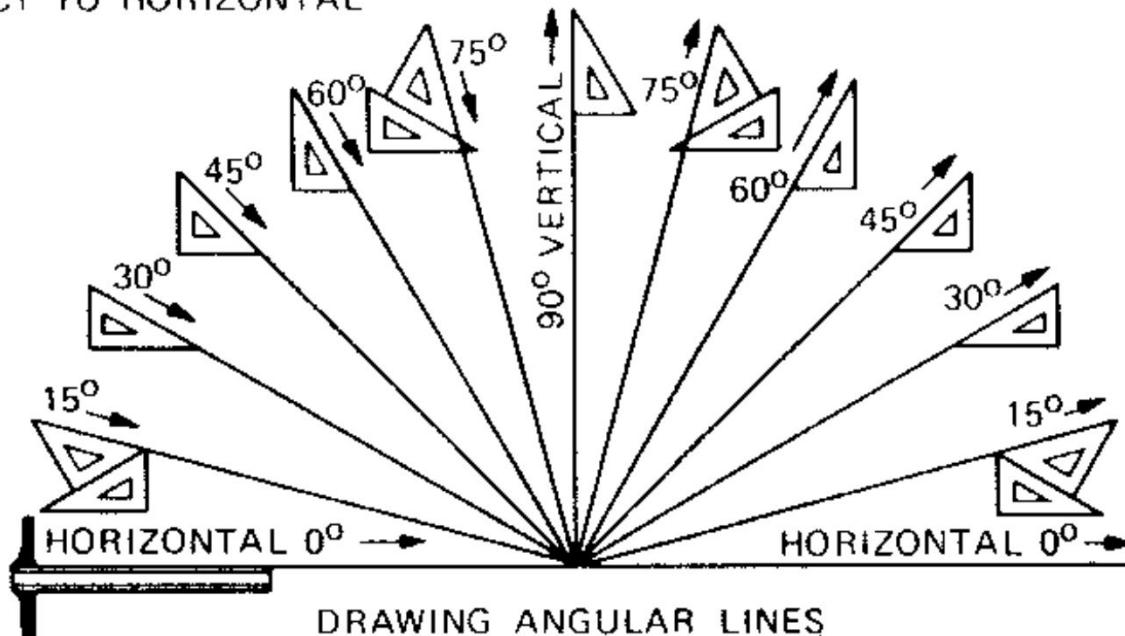
THE 30° - 60° TRIANGLE



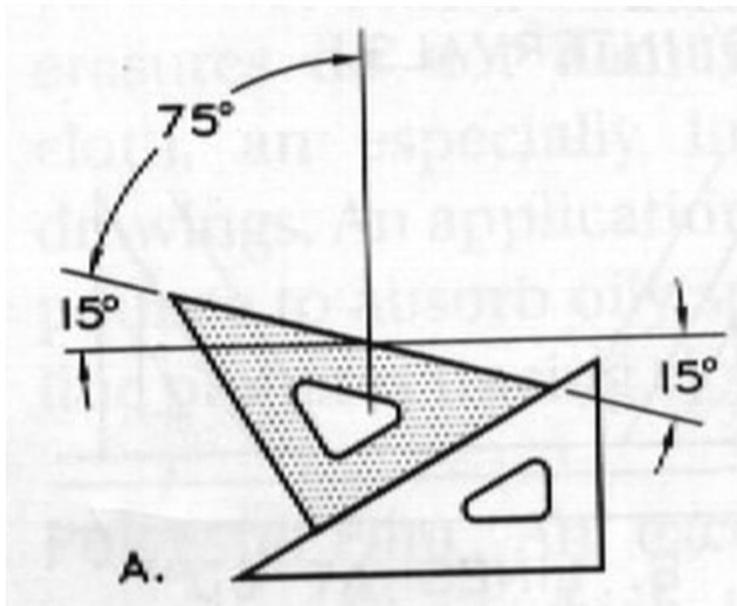
45° TRIANGLE



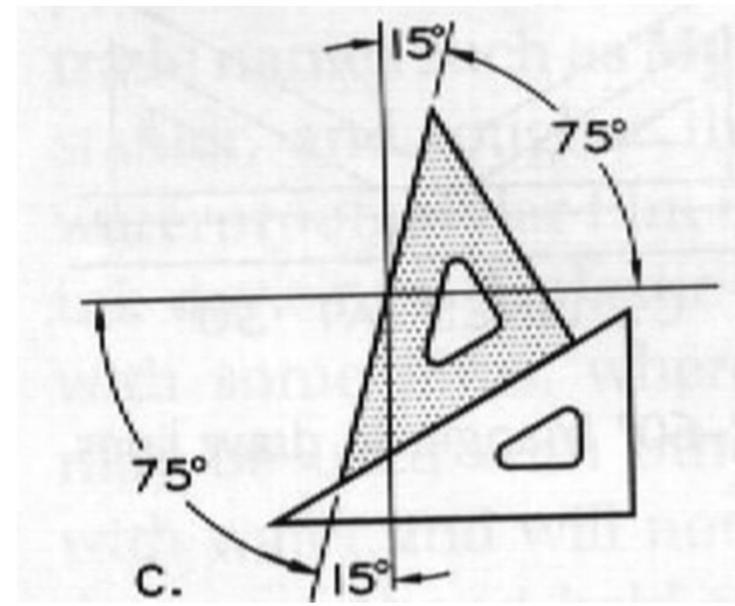
ANGLES WITH
SCT TO HORIZONTAL



DRAWING ANGULAR LINES



A.

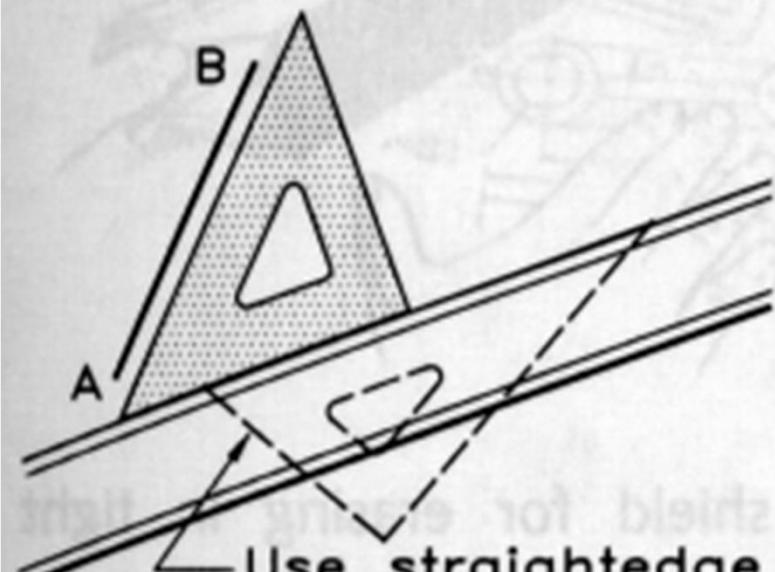


C.

การเขียนเส้นขนาน

DRAWING A PARALLEL LINE

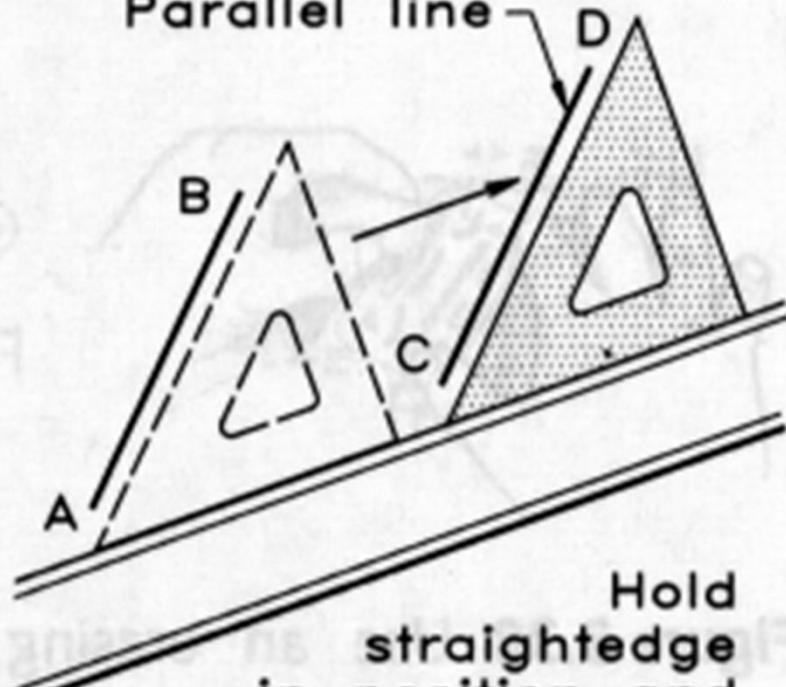
Align triangle with
line AB



Use straightedge
or triangle here

STEP 1

Parallel line

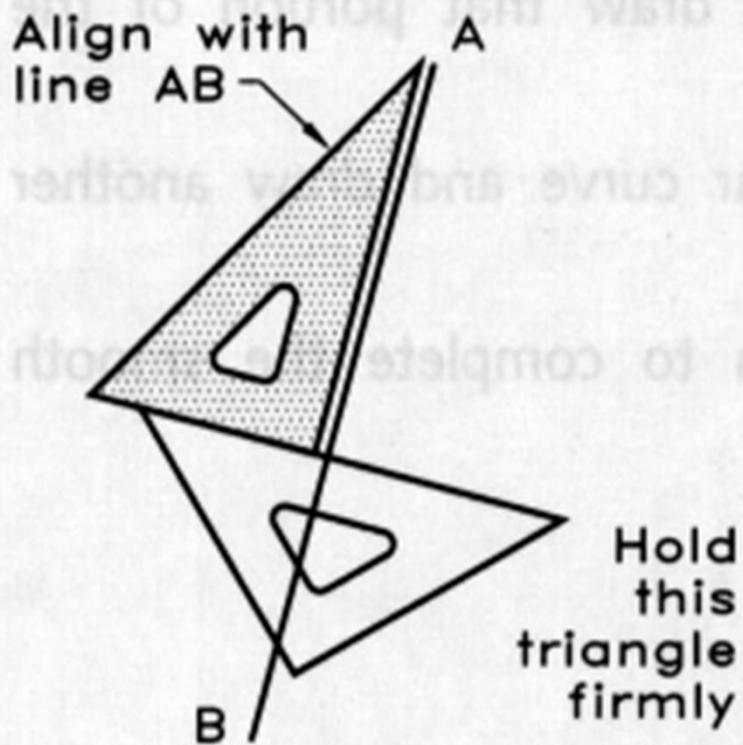


Hold
straightedge
in position and
slide triangle

STEP 2

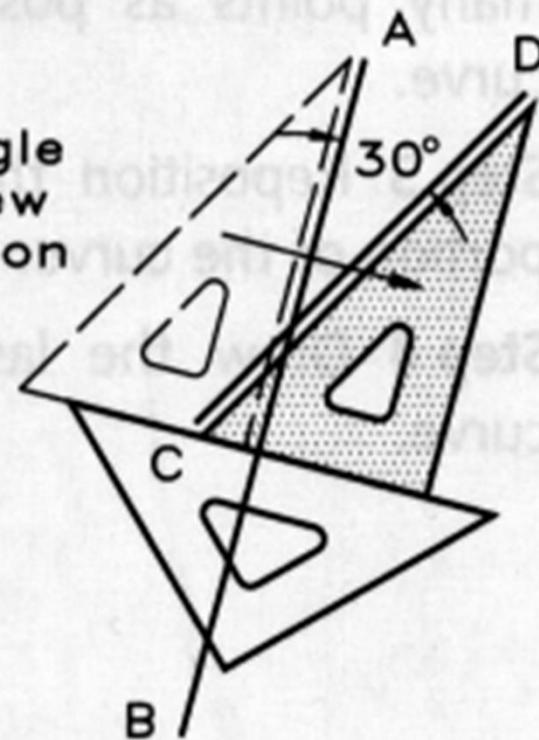
การเขียนเส้น 30°

DRAWING A 30° ANGLE



STEP 1

Slide triangle to new position

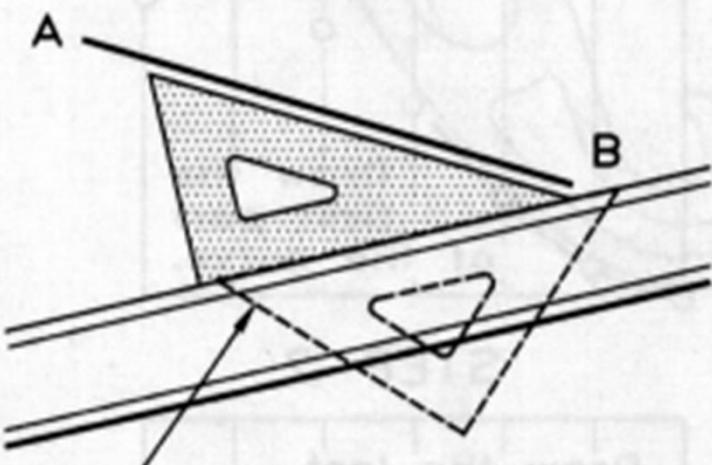


STEP 2

การเขียนเส้นตั้งฉาก

DRAWING A PERPENDICULAR

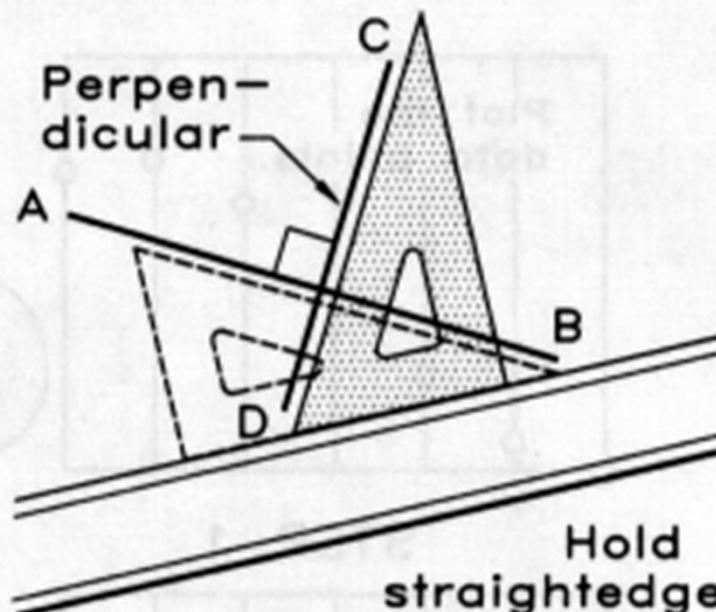
Align triangle with
line AB



Use straightedge
or triangle here

STEP 1

Perpen-
dicular

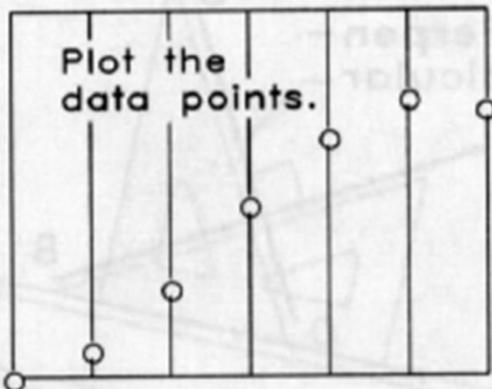


Hold
straightedge
in position and
rotate triangle 90°

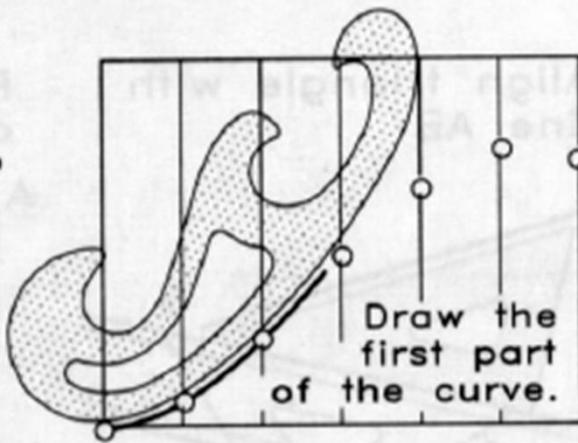
STEP 2

บรรทัดเขียนส่วนโค้ง Irregular Curves , กระดูกงู

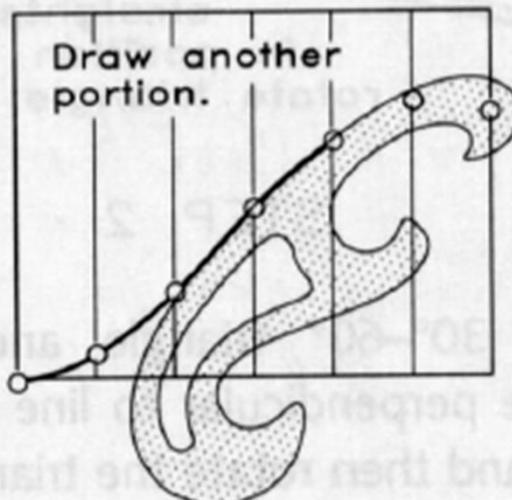
USING THE IRREGULAR CURVE



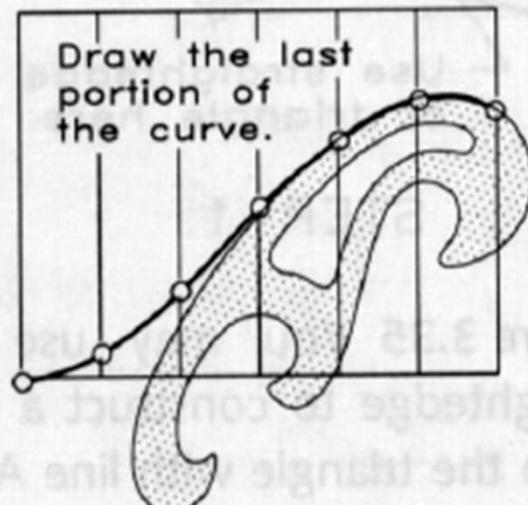
STEP 1



STEP 2



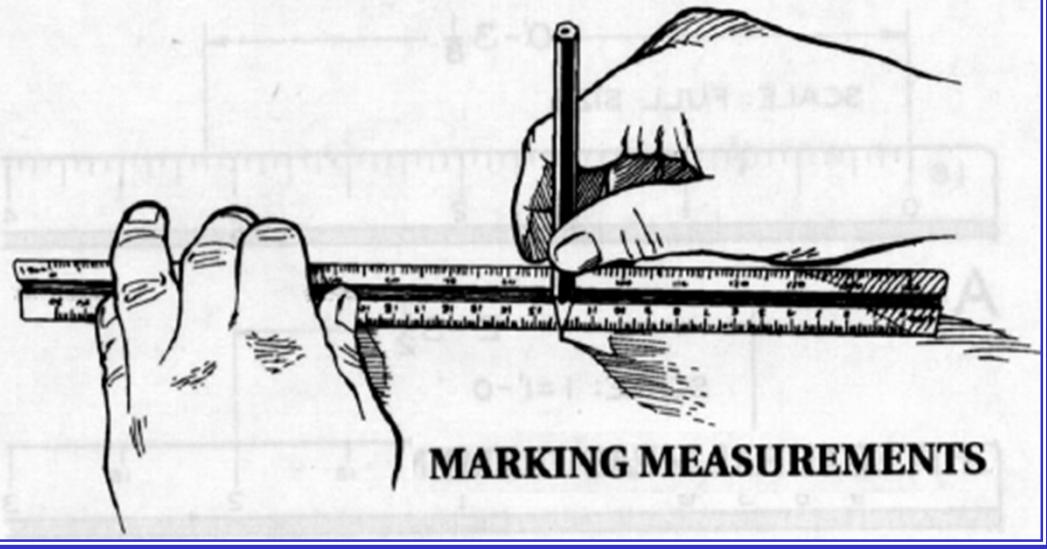
STEP 3



STEP 4



หน่วยวัด Units



ENGLISH UNITS

English System

THREE BARLEYCRONS I INCH

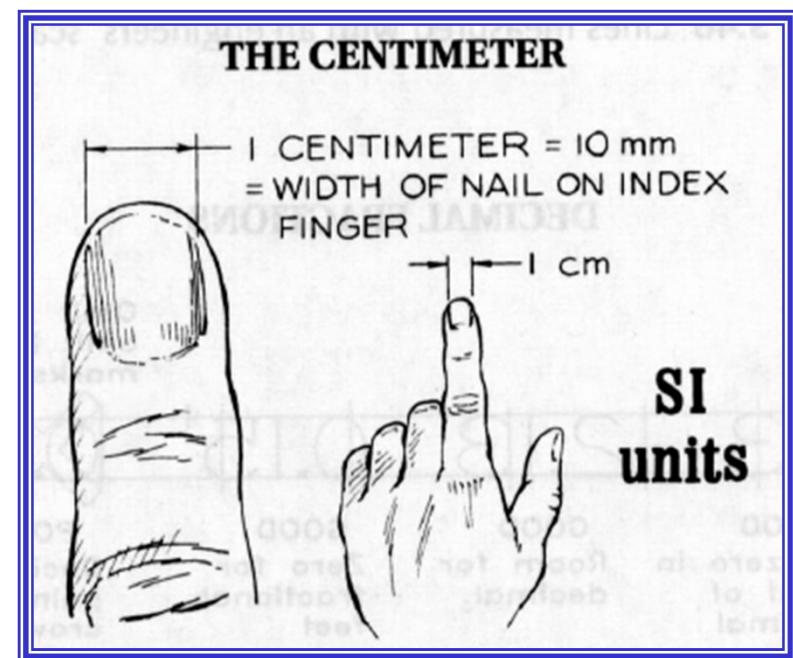
I FOOT

I CUBIT
18-23 INCHES

I YARD

1000 PACES
I MILE

The units of the English system are based on arbitrary dimensions.



TYPES OF SCALES

A. ARCHITECTS' SCALE

Each inch is divided into sixteenths



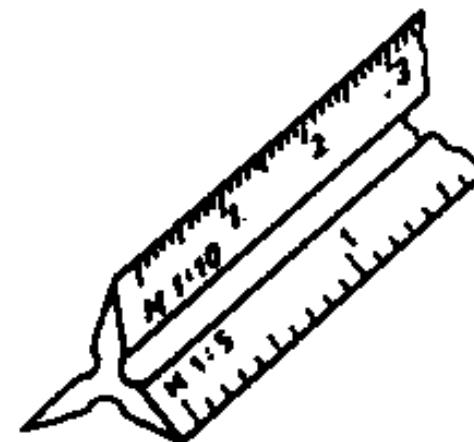
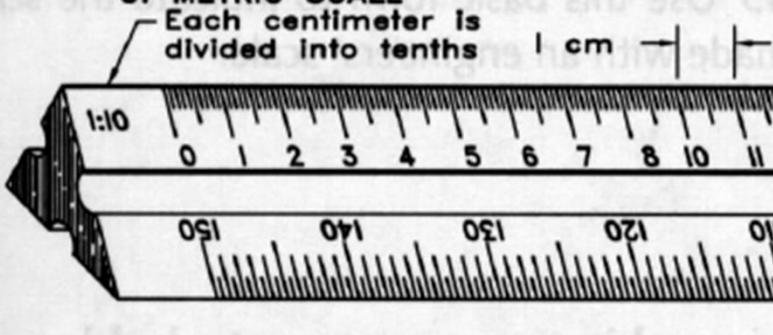
B. ENGINEERS' SCALE

10 means that each inch is divided into tenths



C. METRIC SCALE

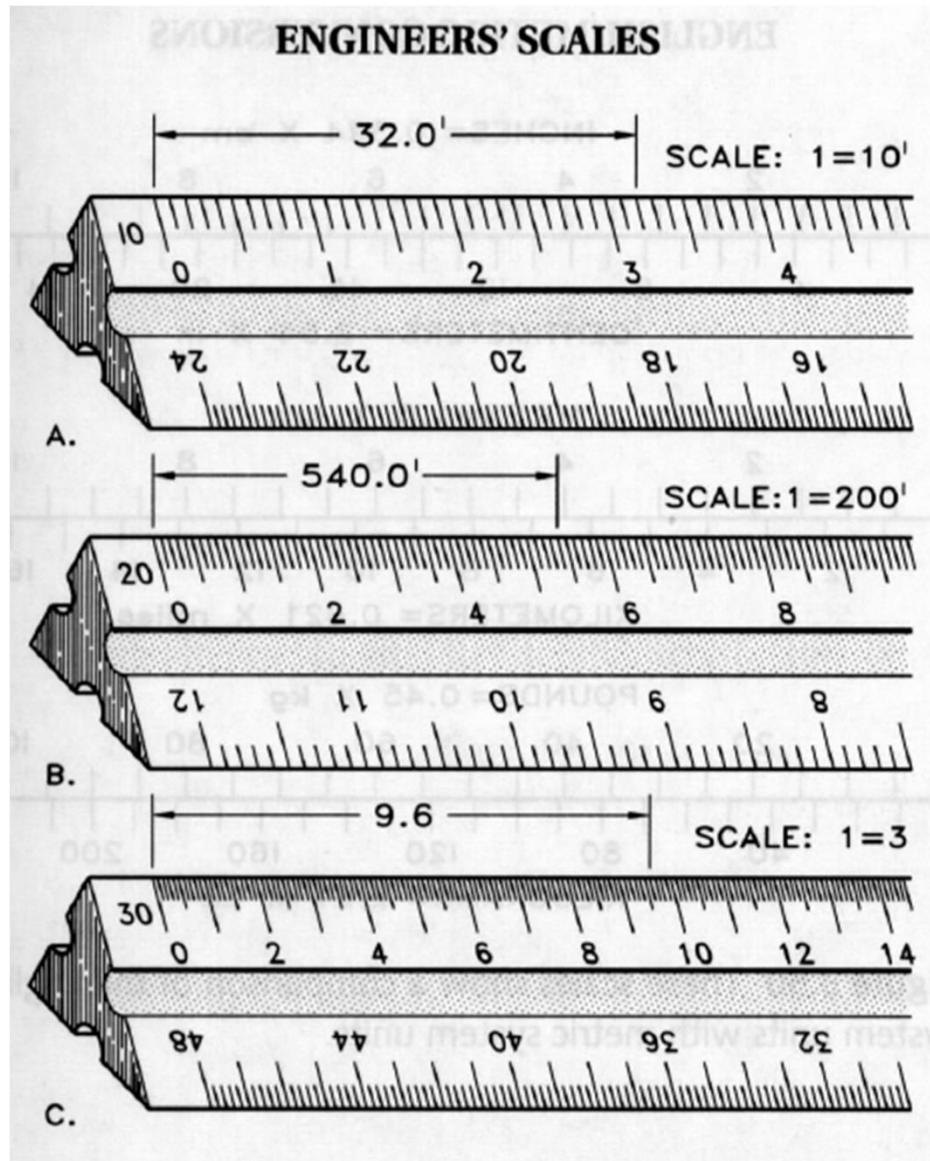
Each centimeter is divided into tenths



METRIC PREFIXES AND ABBREVIATIONS

Value	Prefix	Symbol	Pronunciation
$1,000,000 = 10^6$	= Mega	M	"Megah"
$1,000 = 10^3$	= Kilo	k	"Keylow"
$100 = 10^2$	= Hecto	h	"Heck tow"
$10 = 10^1$	= Deka	da	"Dekah"
1 =			
$0.1 = 10^{-1}$	= Deci	d	"Des sigh"
$0.01 = 10^{-2}$	= Centi	c	"Cen'-ti"
$0.001 = 10^{-3}$	= Milli	m	"Mill lee"
$0.000,001 = 10^{-6}$	= Micro	μ	"Microw"

ມາຕະລາມ ນິຈໍາລົມ Scales



ENGINEERS' SCALE

FROM END OF SCALE

BASIC FORM $SCALE: I = XX$

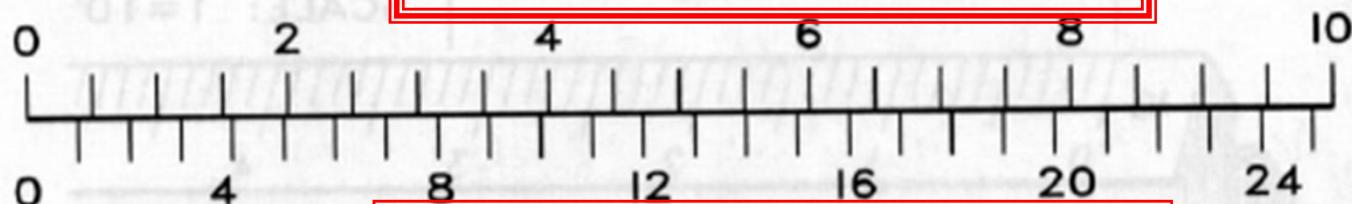
EXAMPLE SCALES

10	SCALE: $I=I'$	SCALE: $I=1,000$
20	SCALE: $I=200'$	SCALE: $I=20 LB$
30	SCALE: $I=3'$	SCALE: $I=3,000'$
40	SCALE: $I=4'$	SCALE: $I=40'$
50	SCALE: $I=50'$	SCALE: $I=500'$
60	SCALE: $I=6$	SCALE: $I=0.6'$

การแปลงหน่วยวัด

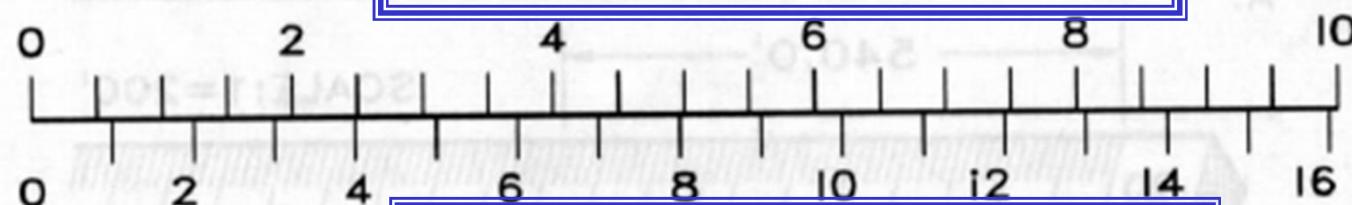
ENGLISH/METRIC CONVERSIONS

INCHES = 0.394 X cm



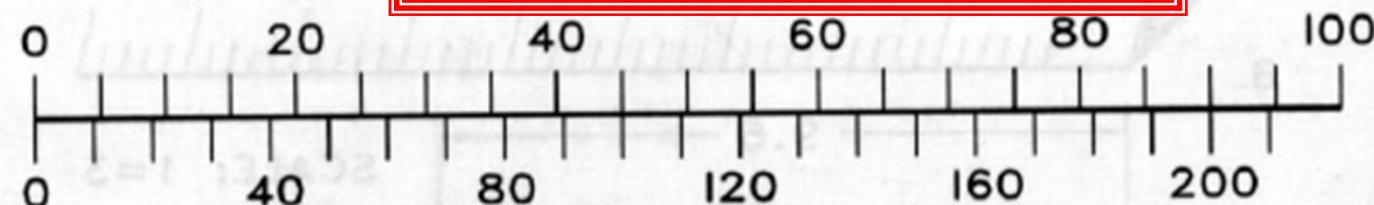
CENTIMETERS = 2.54 X in

MILES=1.6 X km



KILOMETERS= 0.621 X miles

POUNDS = 0.45 X kg



KILOGRAMS = 2.21 X LB

มาตราส่วน Scales

METRIC SCALES

FROM END
OF SCALE →
BASIC FORM SCALE: $1 = \frac{XX}{XX}$

EXAMPLE SCALES

SCALE: 1:1 ($1\text{mm} = 1\text{mm}$; $1\text{cm} = 1\text{cm}$)

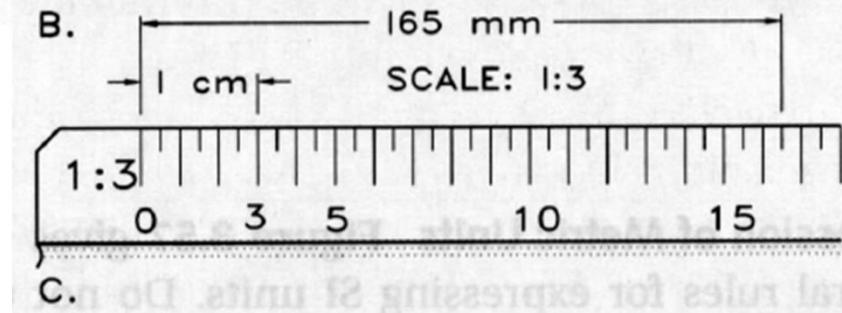
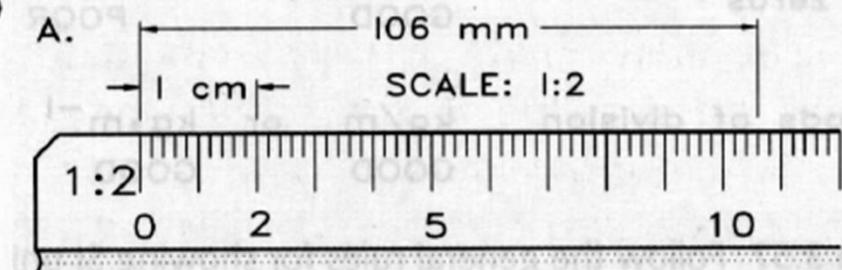
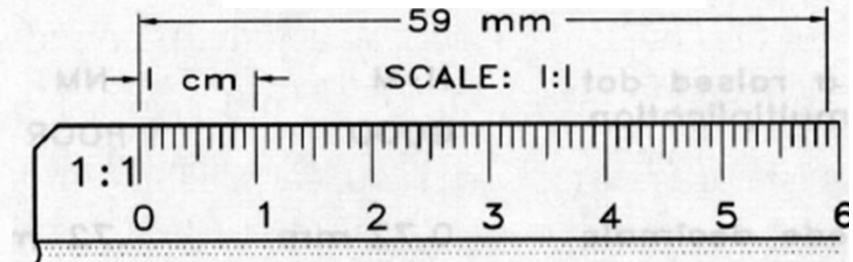
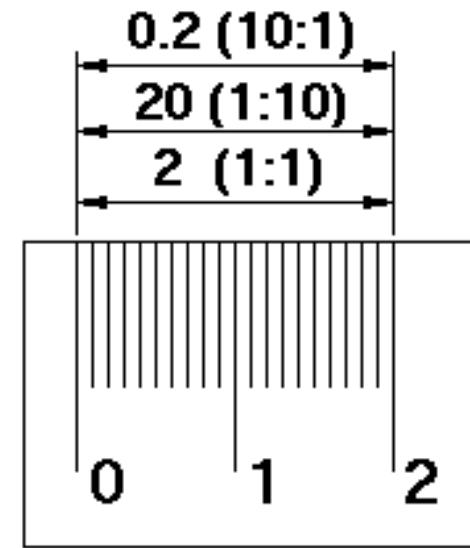
SCALE: 1:2 ($1\text{mm} = 2\text{mm}$; $1\text{mm} = 20\text{mm}$)

SCALE: 1:3 ($1\text{mm} = 30\text{mm}$; $1\text{mm} = 0.3\text{mm}$)

SCALE: 1:4 ($1\text{mm} = 4\text{mm}$; $1\text{mm} = 40\text{mm}$)

SCALE: 1:5 ($1\text{mm} = 5\text{mm}$; $1\text{mm} = 500\text{mm}$)

SCALE: 1:6 ($1\text{mm} = 6\text{mm}$; $1\text{mm} = 60\text{mm}$)



วงศ์ เวียน Compass

DRAFTING INSTRUMENTS



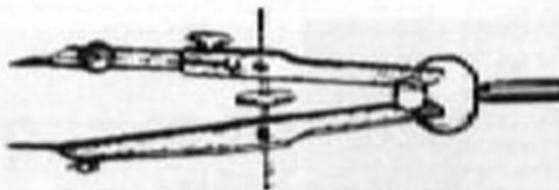
RULING PEN



EXTRA HANDLE



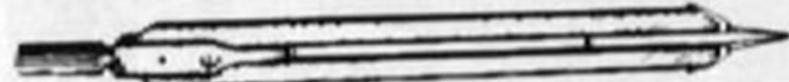
NEEDLE



SMALL BOW COMPASS



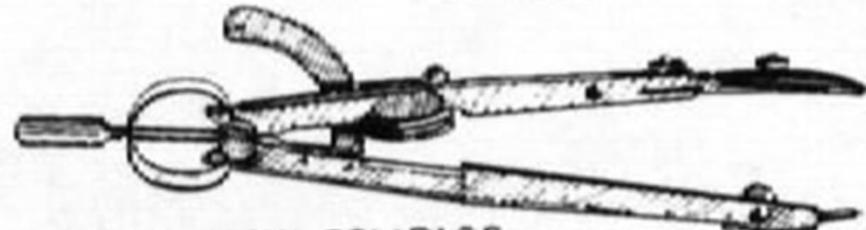
PEN POINT



DIVIDERS



PEN POINT



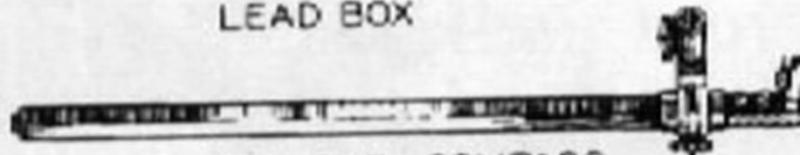
LARGE BOW COMPASS



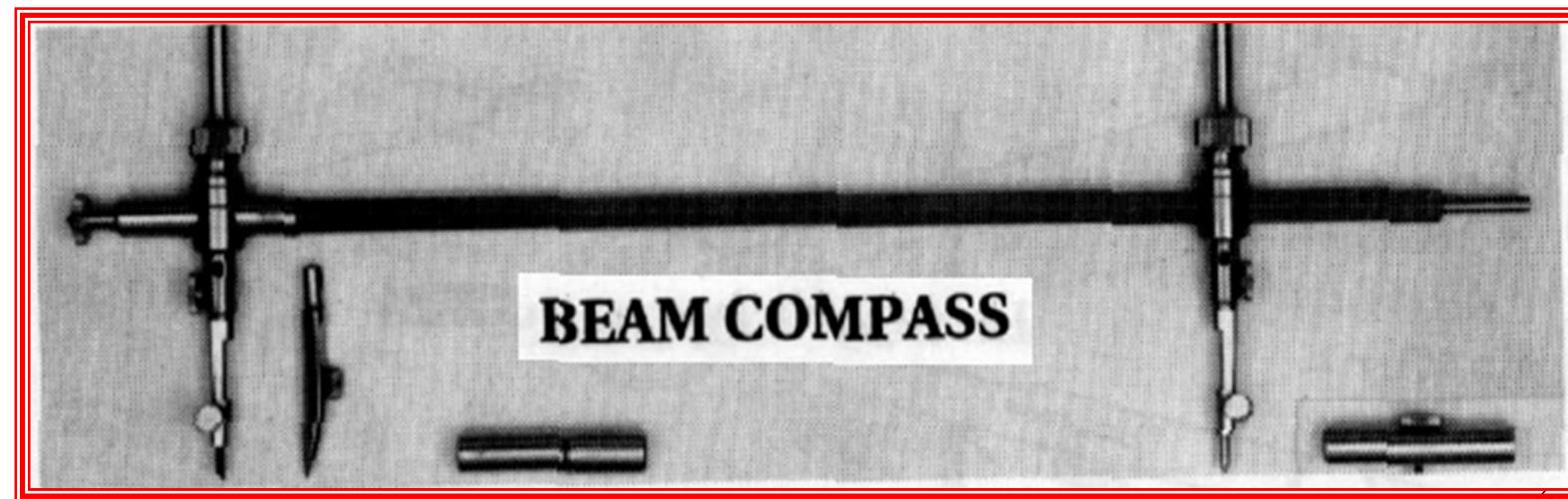
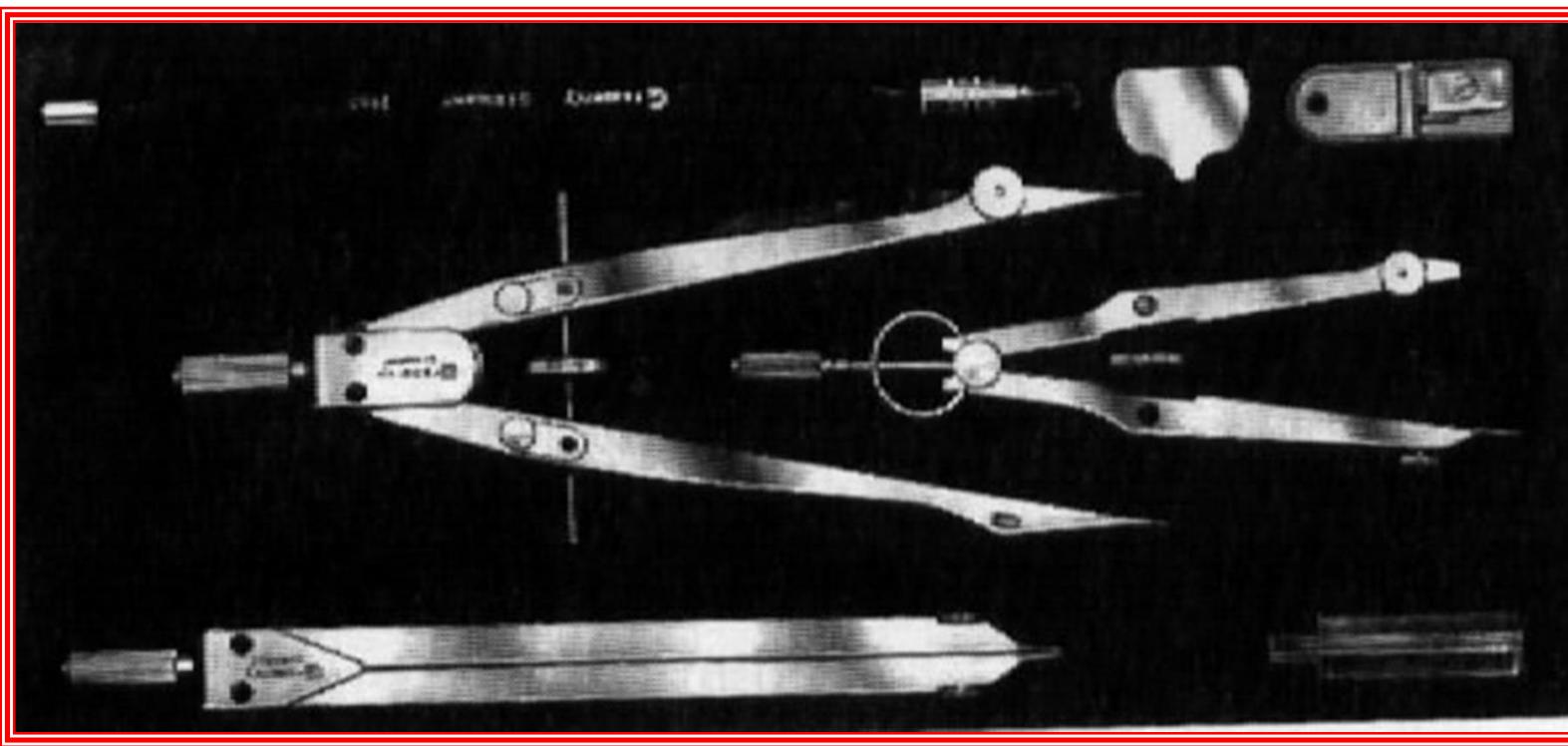
NEEDLE BOX



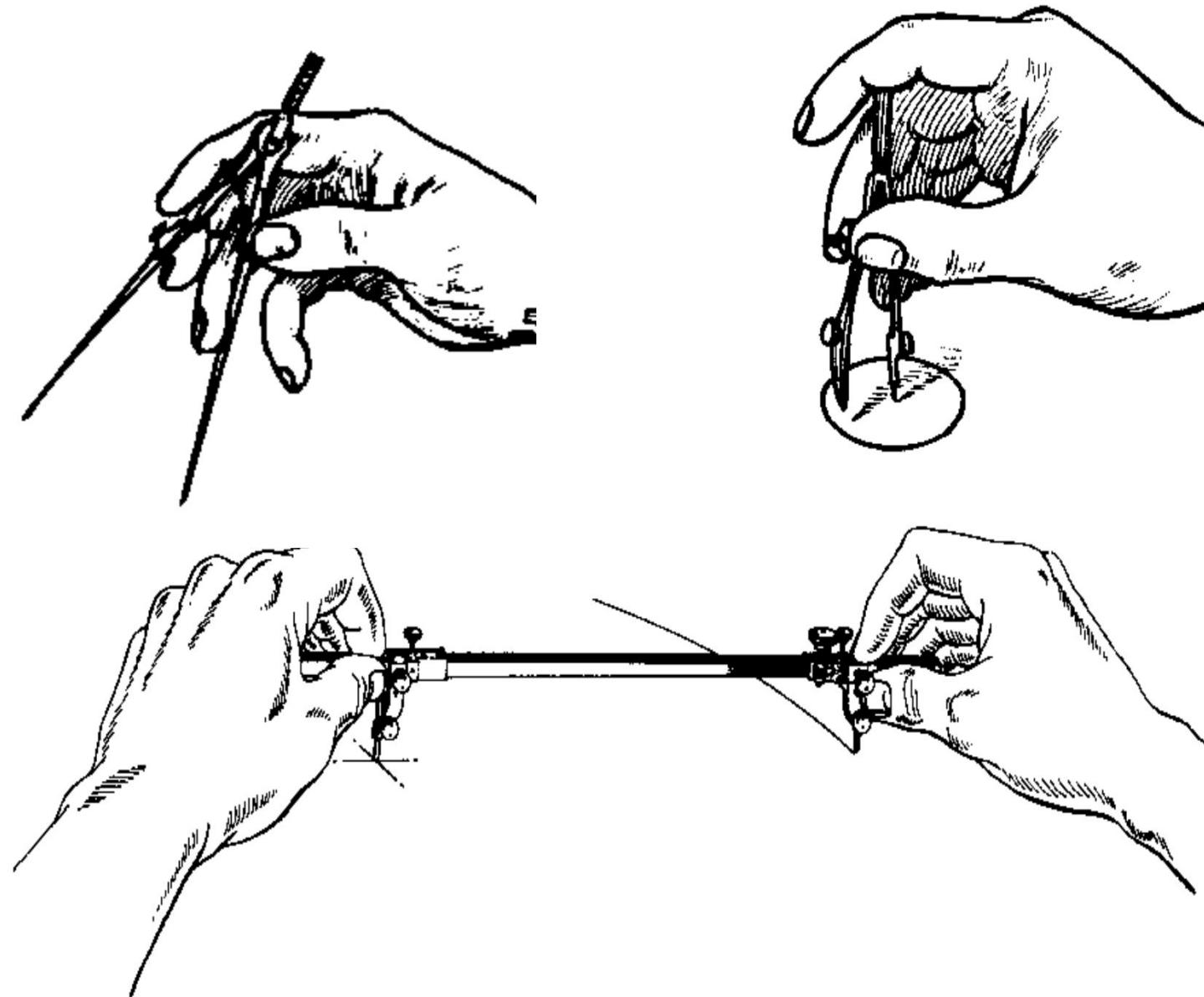
LEAD BOX



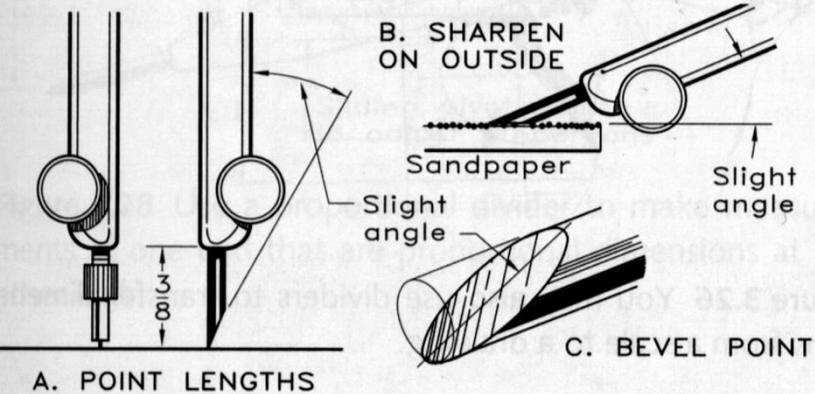
EXTENSION BAR COMPASS



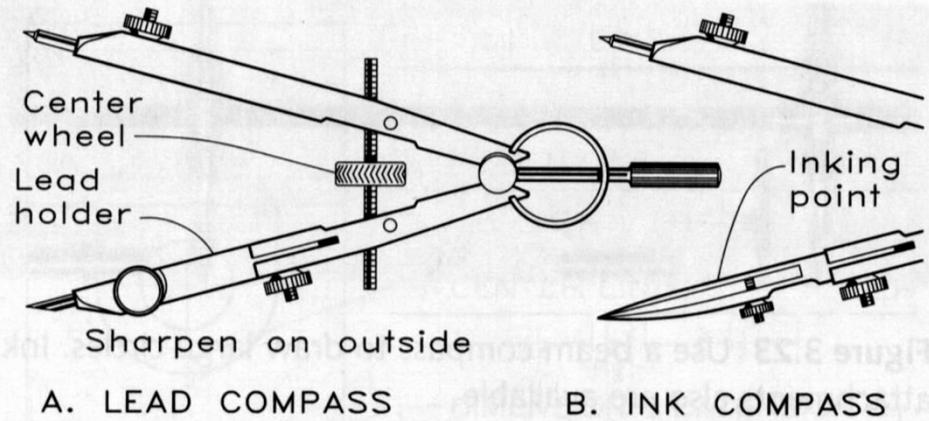
การวางแผนกลม



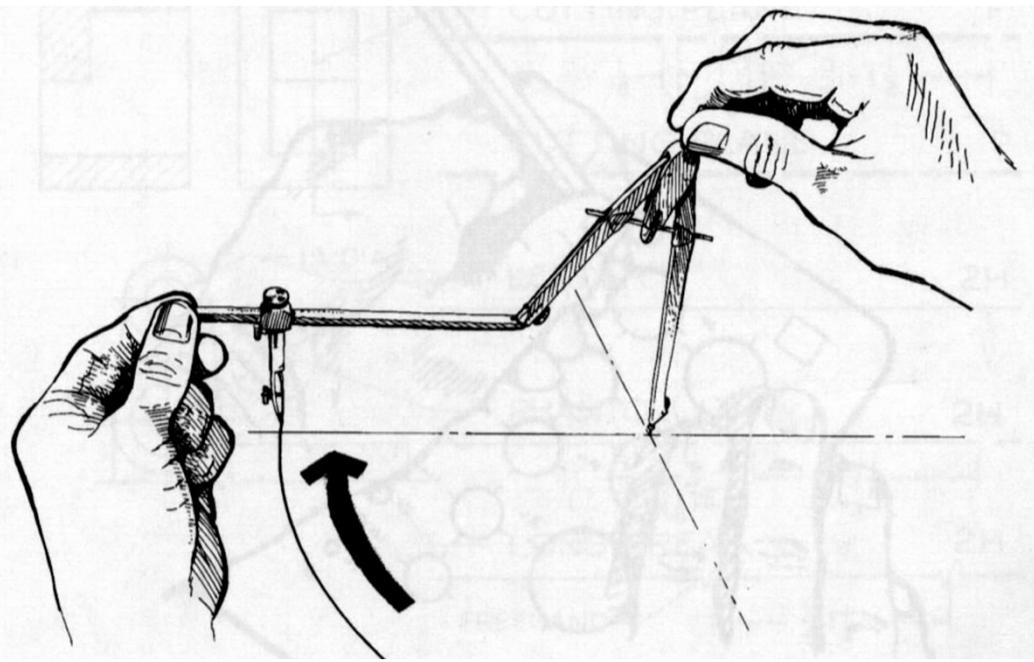
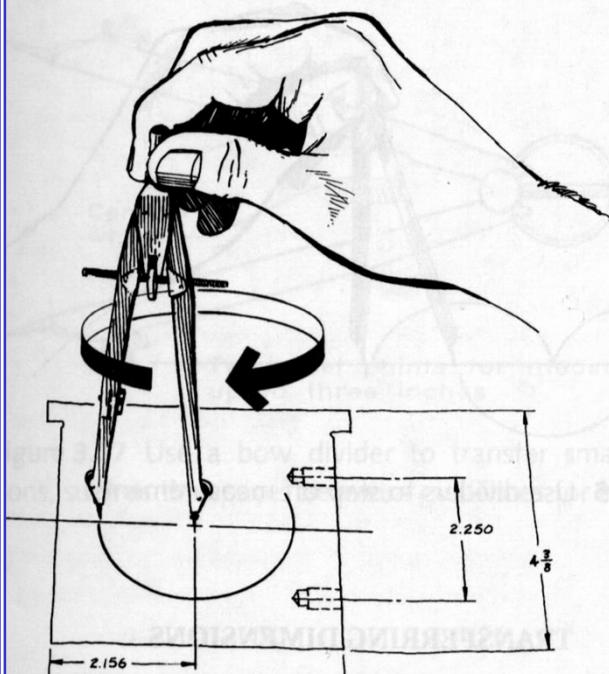
SHARPENING THE COMPASS LEAD



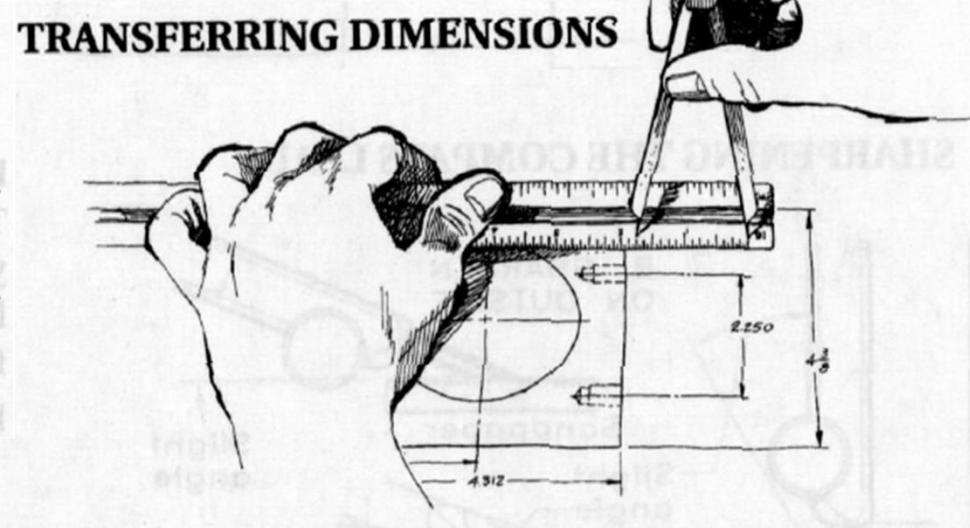
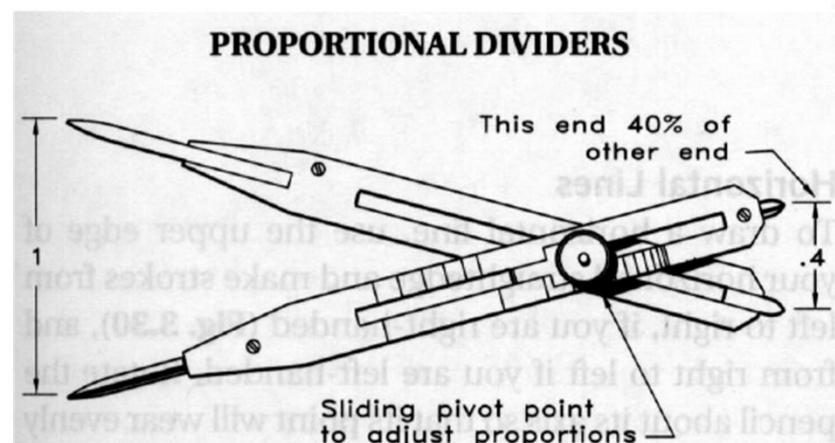
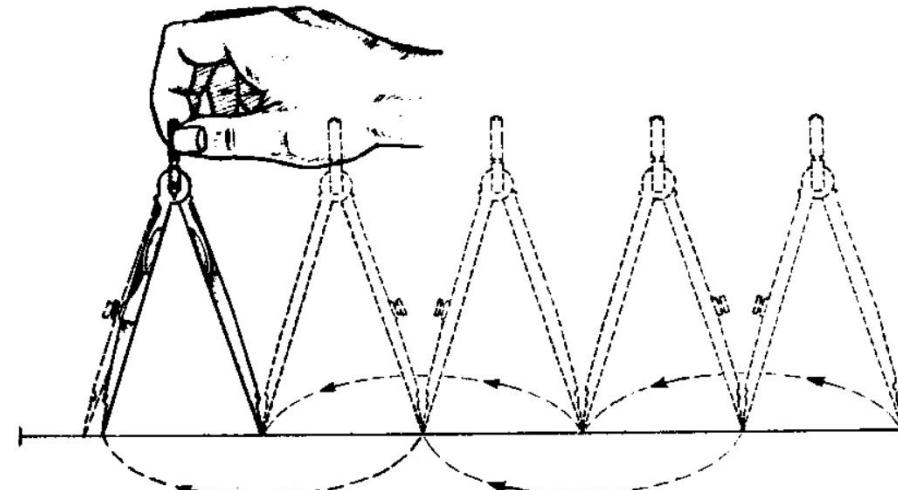
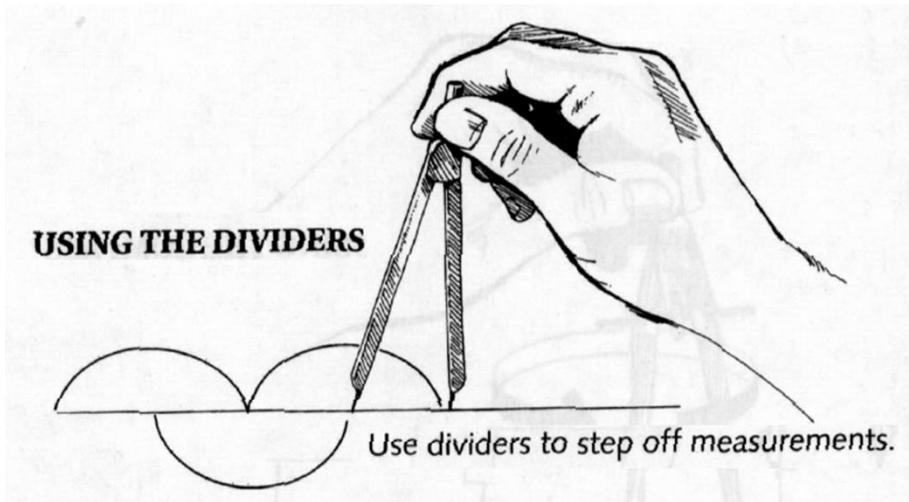
SMALL BOW COMPASSES



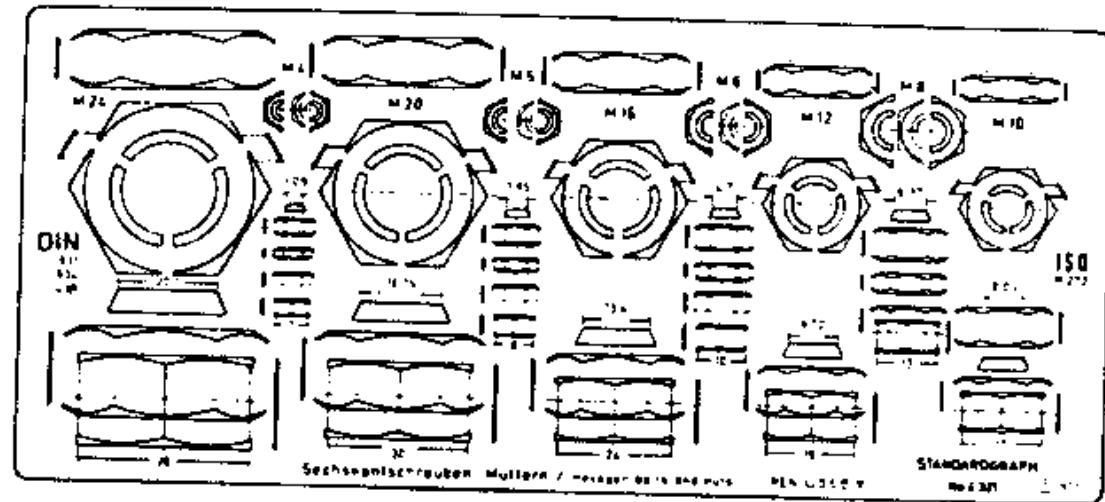
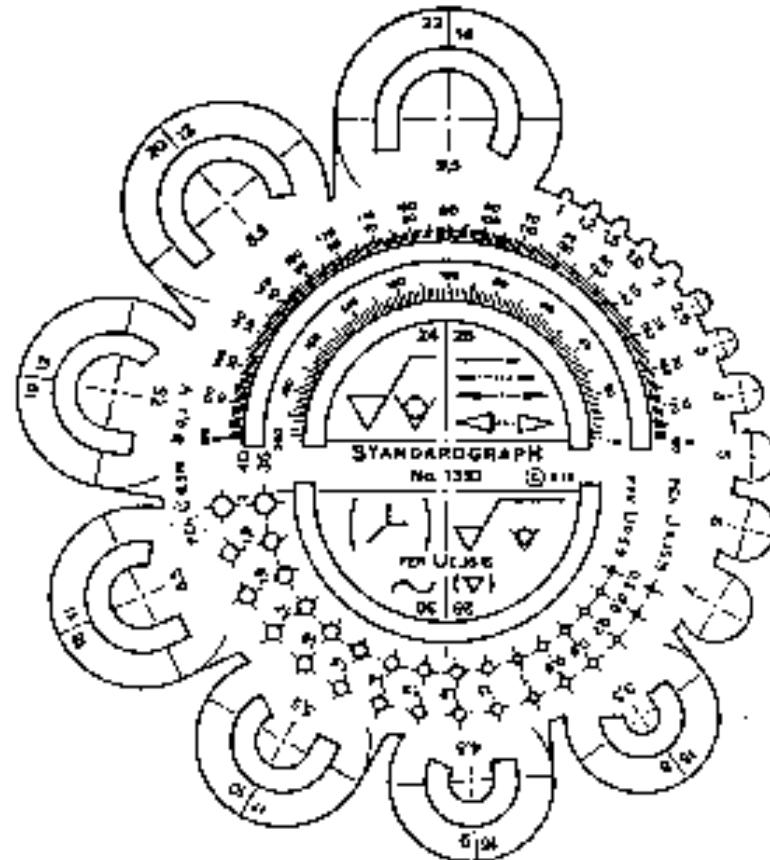
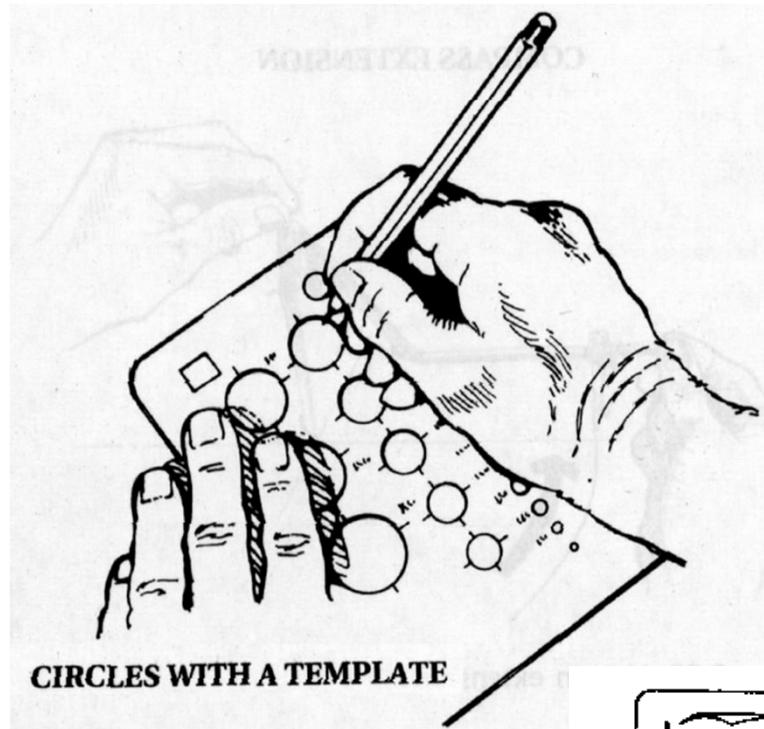
USING THE COMPASS



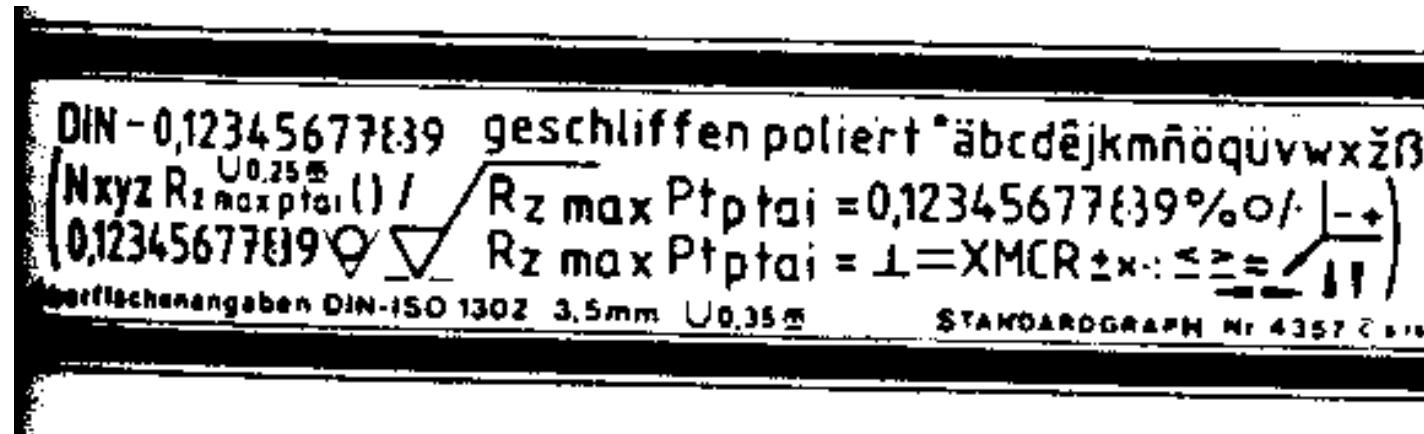
ดิไวเดอร์ Divider



ເທັມເພລທຽບປ່າດງ ຈ

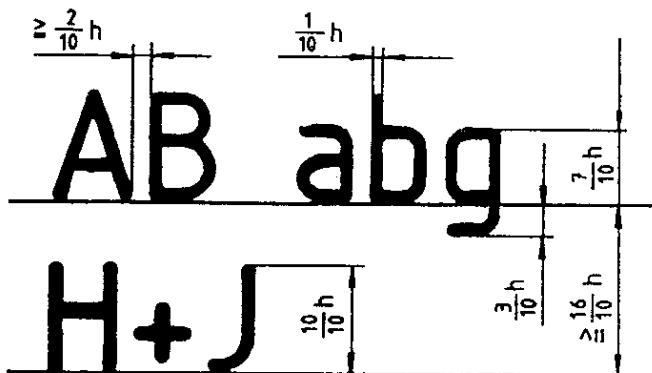


แผ่นรองเขียนตัวอักษร เครื่องช่วยเขียนตัวอักษร



ตัวอักษรแบบตัว

2.5 3.5 5 7 10 14 20



ABCDEFIGHJKLMNOP

QRSTU VWXYZ

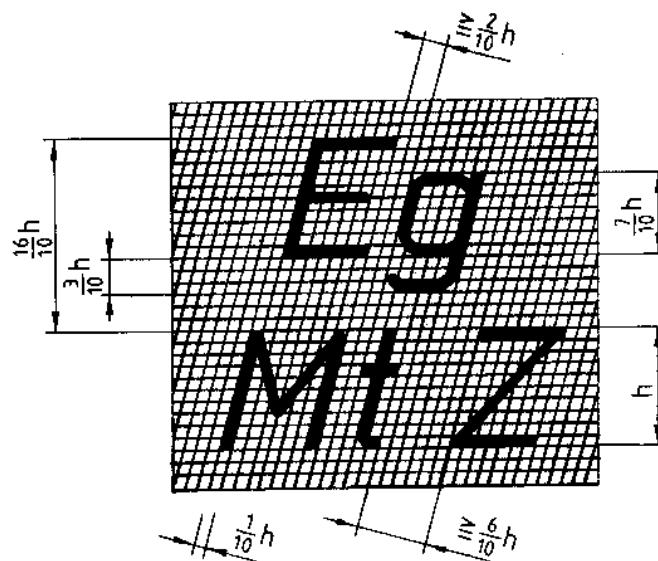
abcde fghijklmnopq

rstuvwxyz

$(P_{ij} - \bar{P}) = +x \cdot \sqrt{\% \delta})] \phi$

01234567789IVX

ตัวอักษรแบบตัวเอียง



ABCDEFIGHJKLMNOP

QRSTU VWXYZ

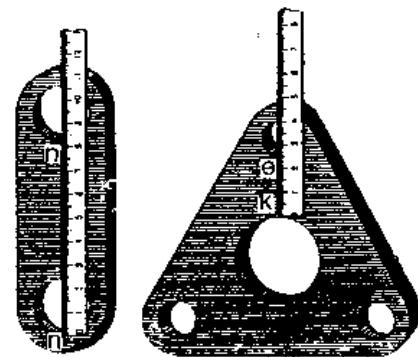
abcde fghijklmnopq

rstuvwxyz

$(P_{ij} - \bar{P}) = +x \cdot \sqrt{\% \delta})] \phi$

01234567789IVX

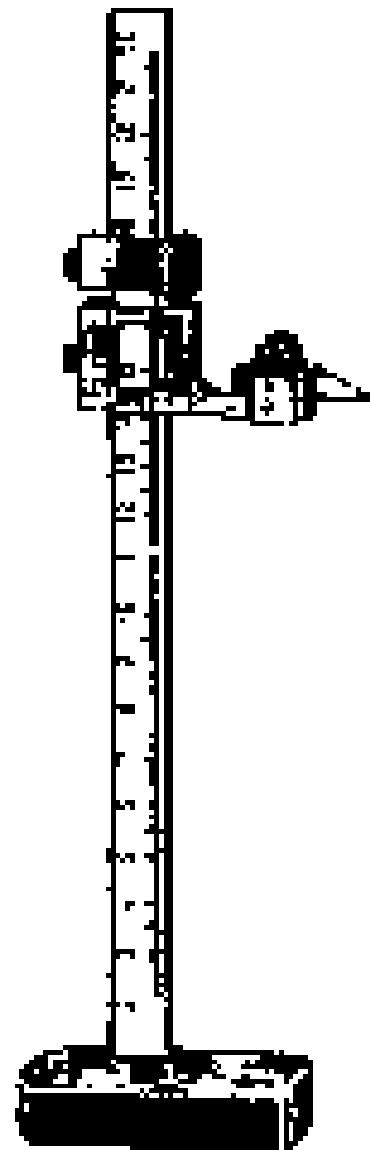
ตลับเมตร



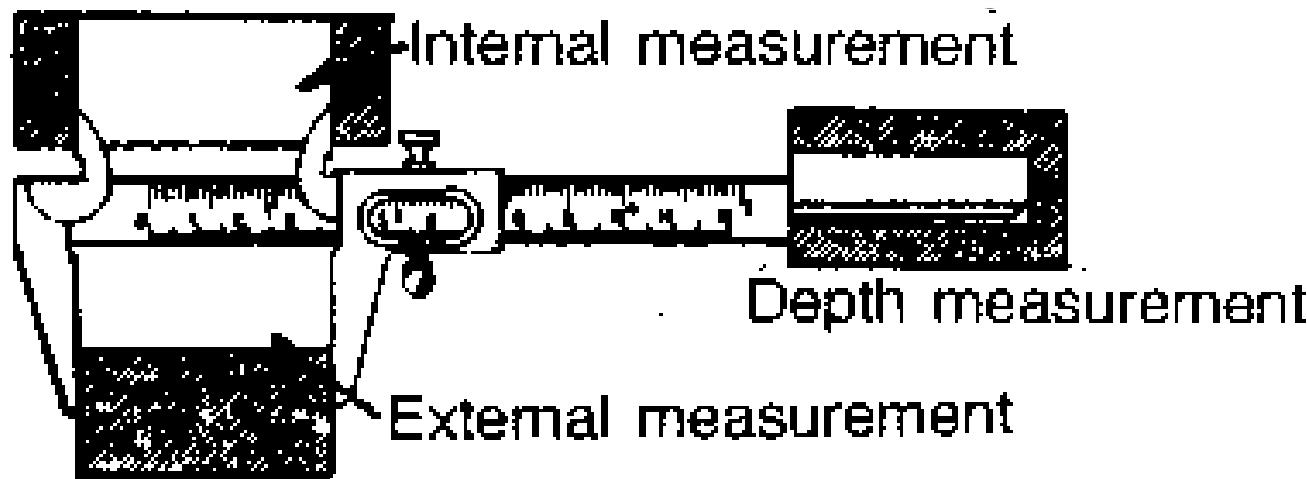
ไมโครมิเตอร์



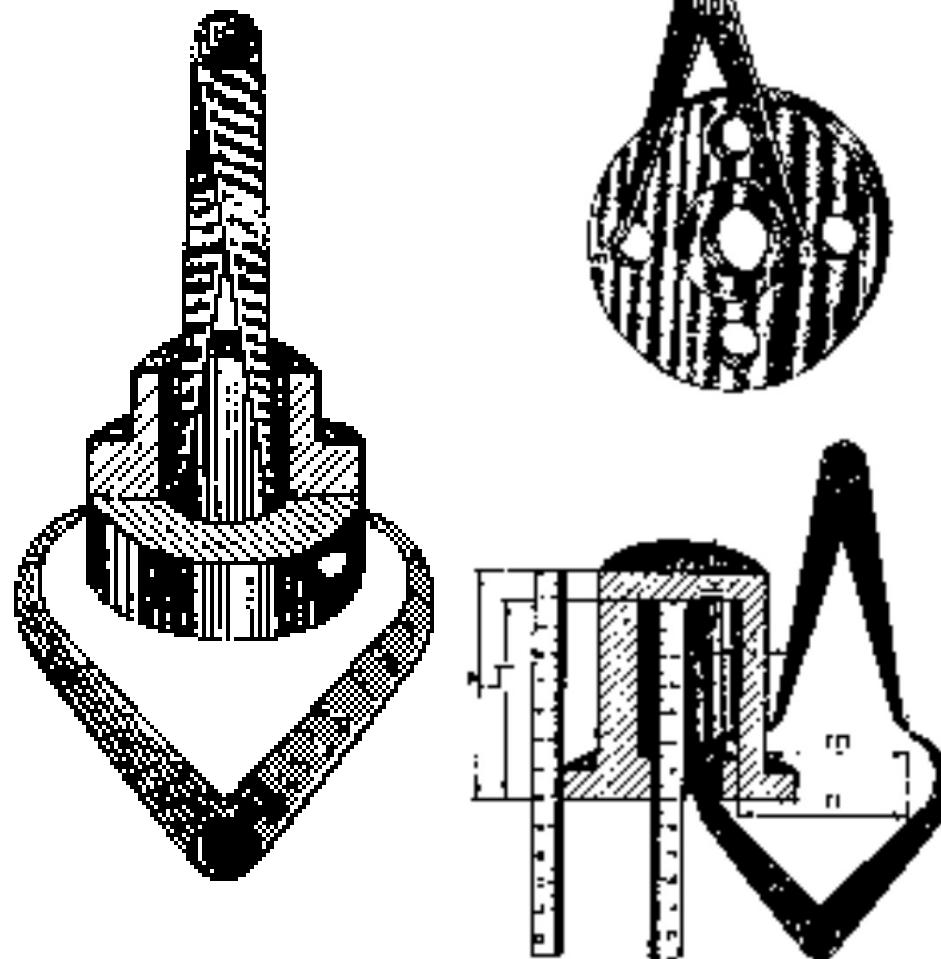
เวอร์เนียร์ไซเกจ



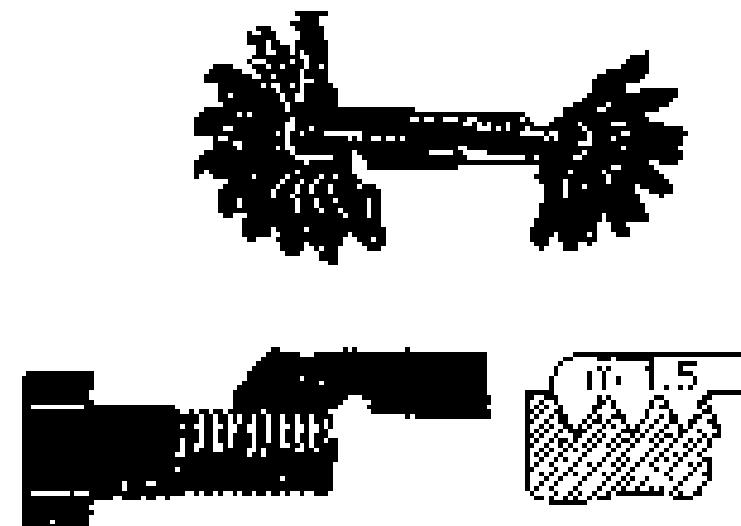
เวอร์เนียร์



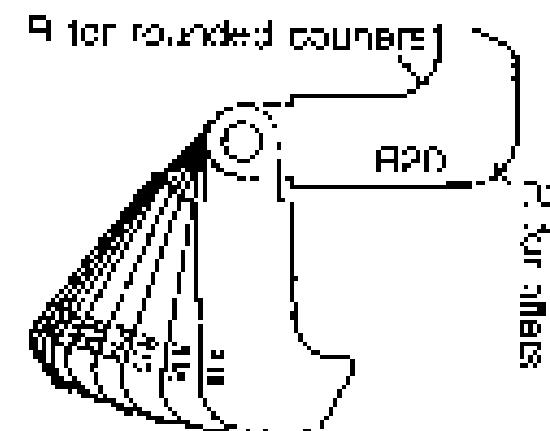
เวอร์เนียร์วัดนอก , เวอร์เนียร์วัดใน



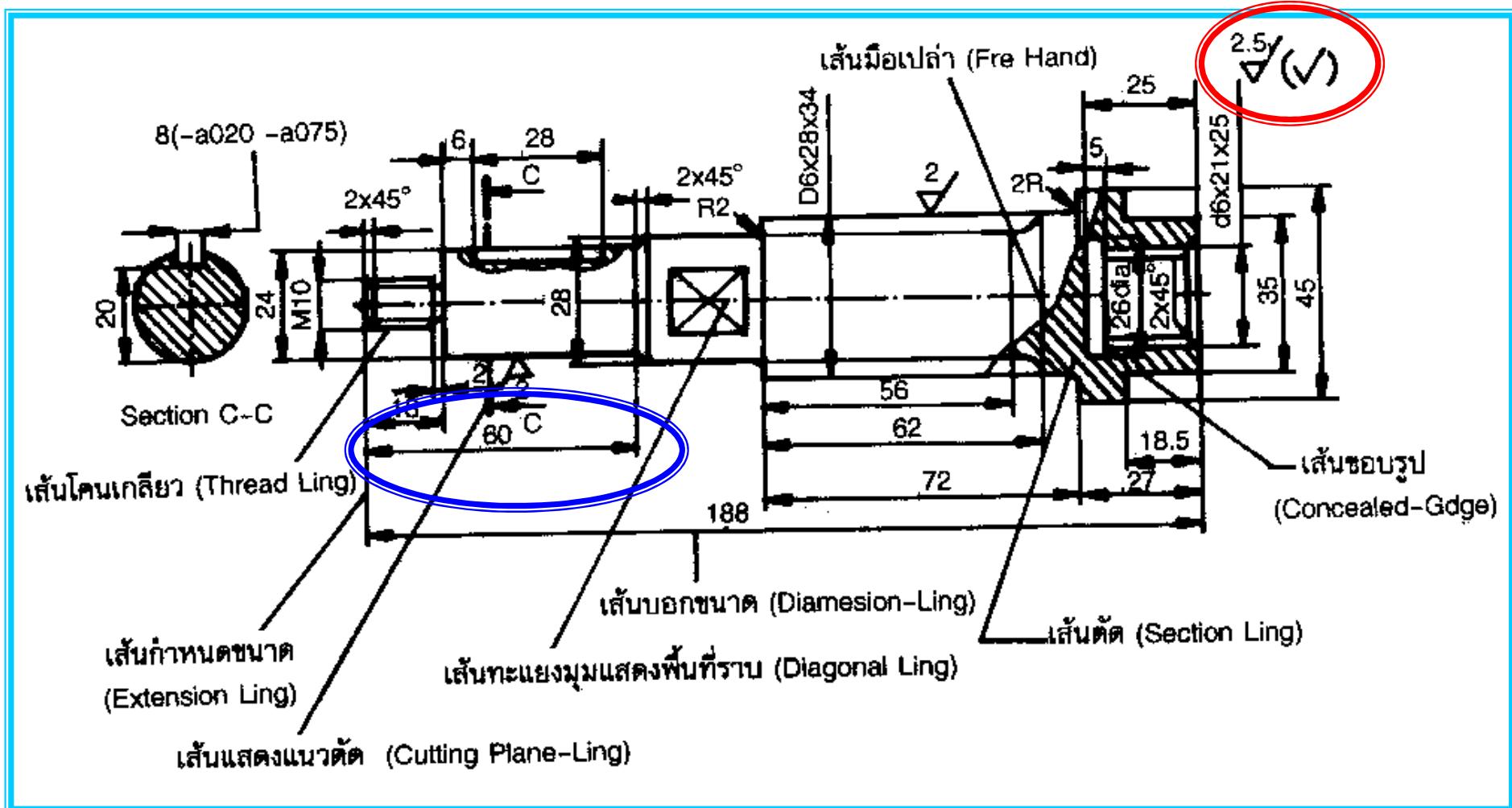
หัววัดเกลี่ย



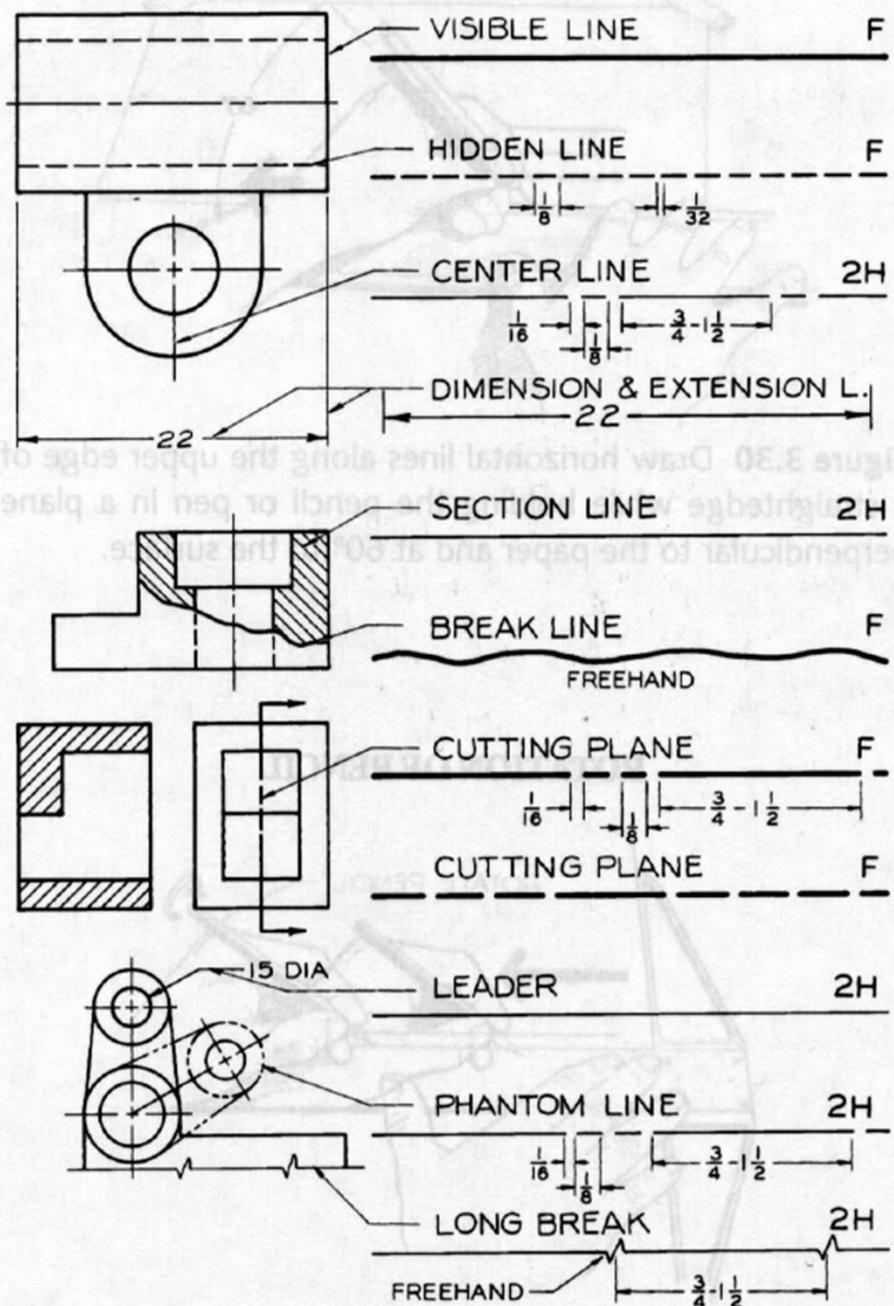
เกจวัดรัศมีโค้ง



องค์ประกอบในงานเขียนแบบทางวิศวกรรม



ALPHABET OF LINES



A		0.5
B		0.25
C		0.35
D		0.5
E		0.25
F		0.25

- เส้นเต็ม หรือ เส้นขอบรูป

Continuous line (หน้า A , เป้า C)

- เส้นประ Dashed line (C)

- เส้นศูนย์กลางใหญ่ Center
line หรือ

ความหนาของเส้น ย่อลงไ...

มาตรฐาน 0.13 0.18 0.25 0.35 0.5 0.7 1.0 1.4 (กดลุ่ม)

กดลุ่ม 0.35 (A,D) 0.18(D,E,F) 0.25(C)

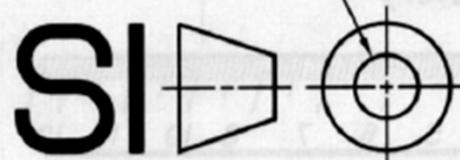
กดลุ่ม 0.5 (A,D) 0.25(D,E,F) 0.35(C) ...

มาตรฐาน 2 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.2 (4 กดลุ่ม)

กดลุ่ม 0.3 (A,D) 0.1(D,E,F) 0.2(C)

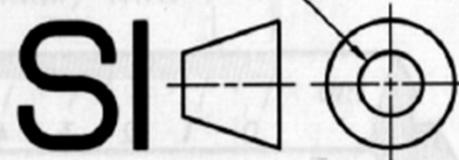
THE SI SYMBOL

U.S. projection
where circle is
visible here



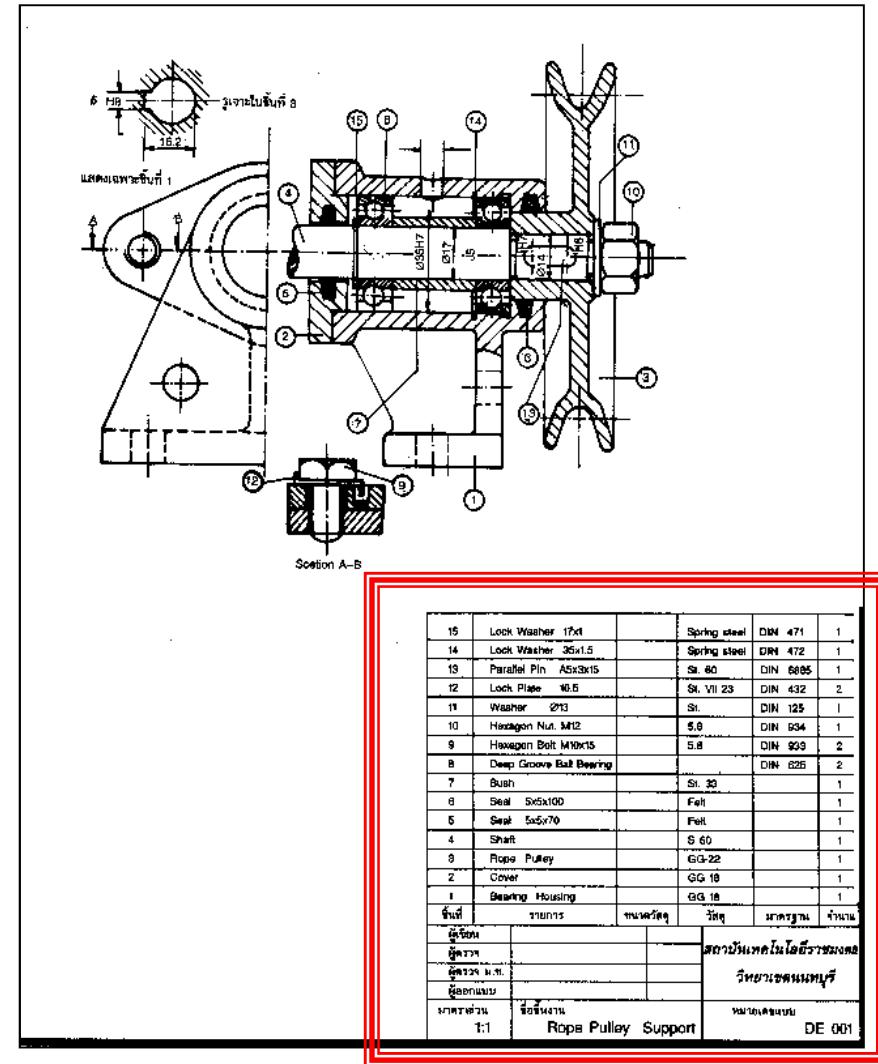
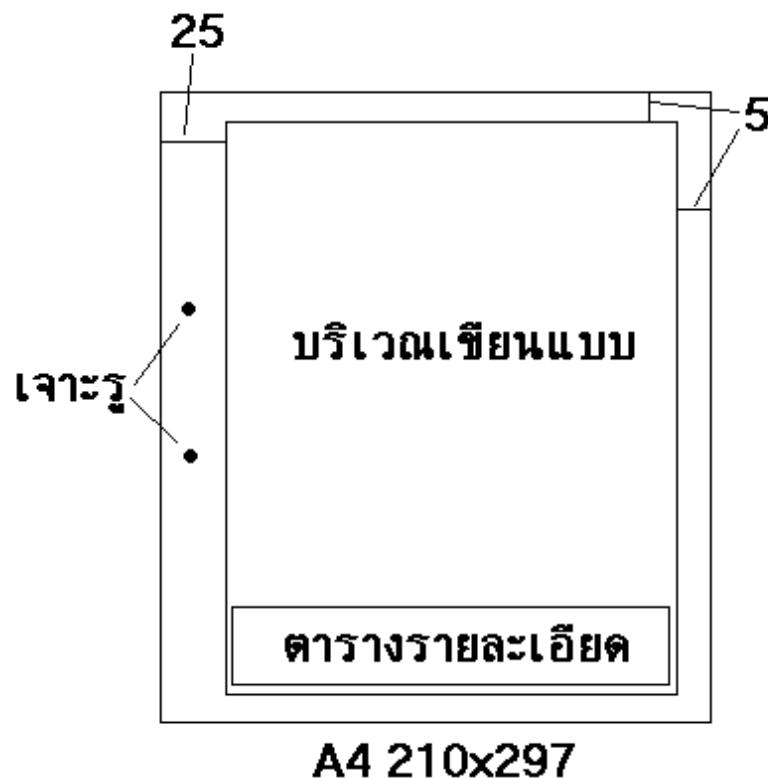
A. METRIC UNITS AND
THIRD ANGLE OF
PROJECTION

European projection where
circle is visible, but
would be hidden in U.S.
projection



B. METRIC UNITS AND
FIRST ANGLE OF
PROJECTION

หน้าการดำเนินแบบ



ตารางรายละเอียด

การพับกระดาษเข้าแฟ้ม

มาตรฐานการพับกระดาษ

$$A0 = 841 \times 1189 \text{ (mm}^2\text{)}$$

$$A1 = 594 \times 841$$

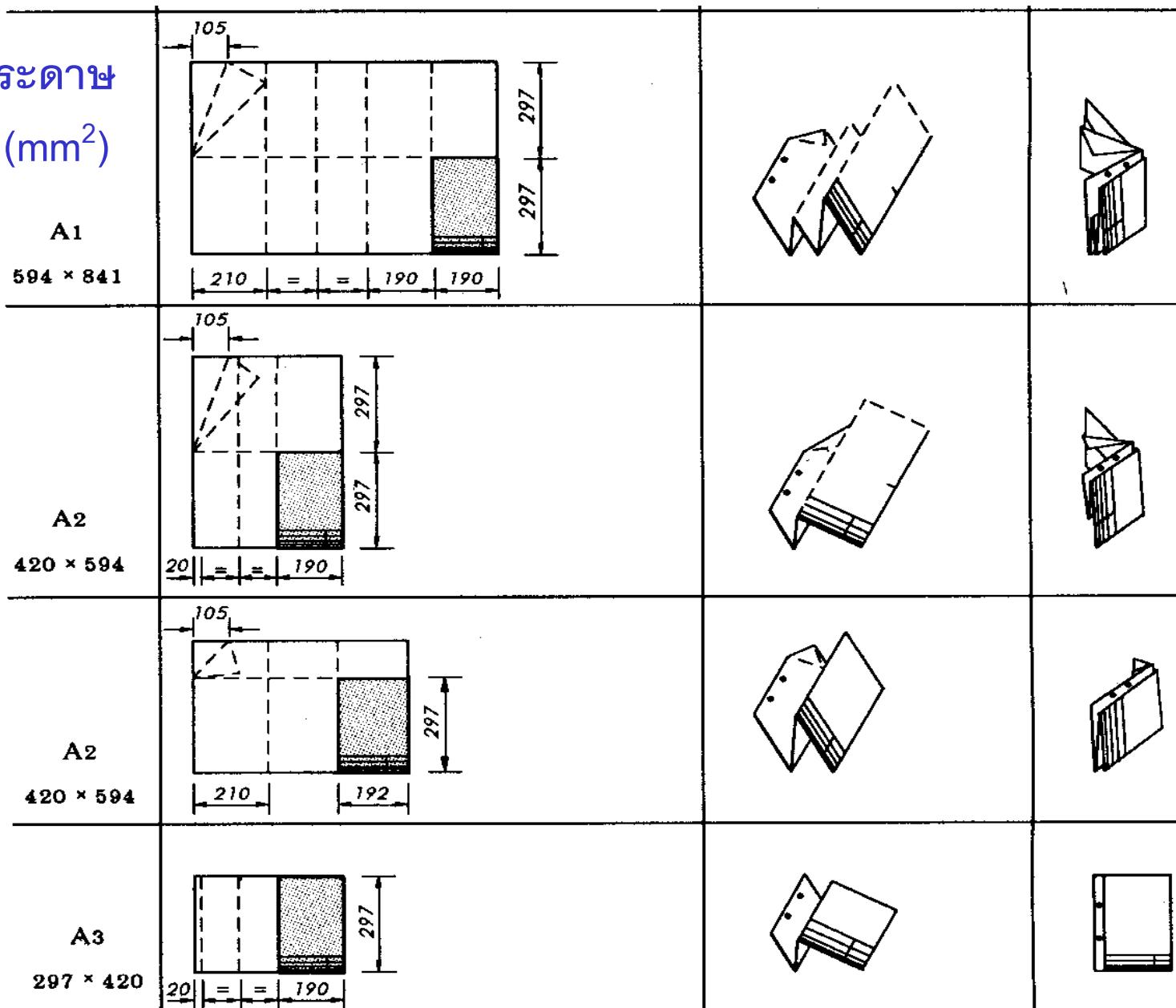
$$A2 = 420 \times 841$$

$$A3 = 297 \times 420$$

$$A4 = 210 \times 297$$

$$A5 = 148 \times 210$$

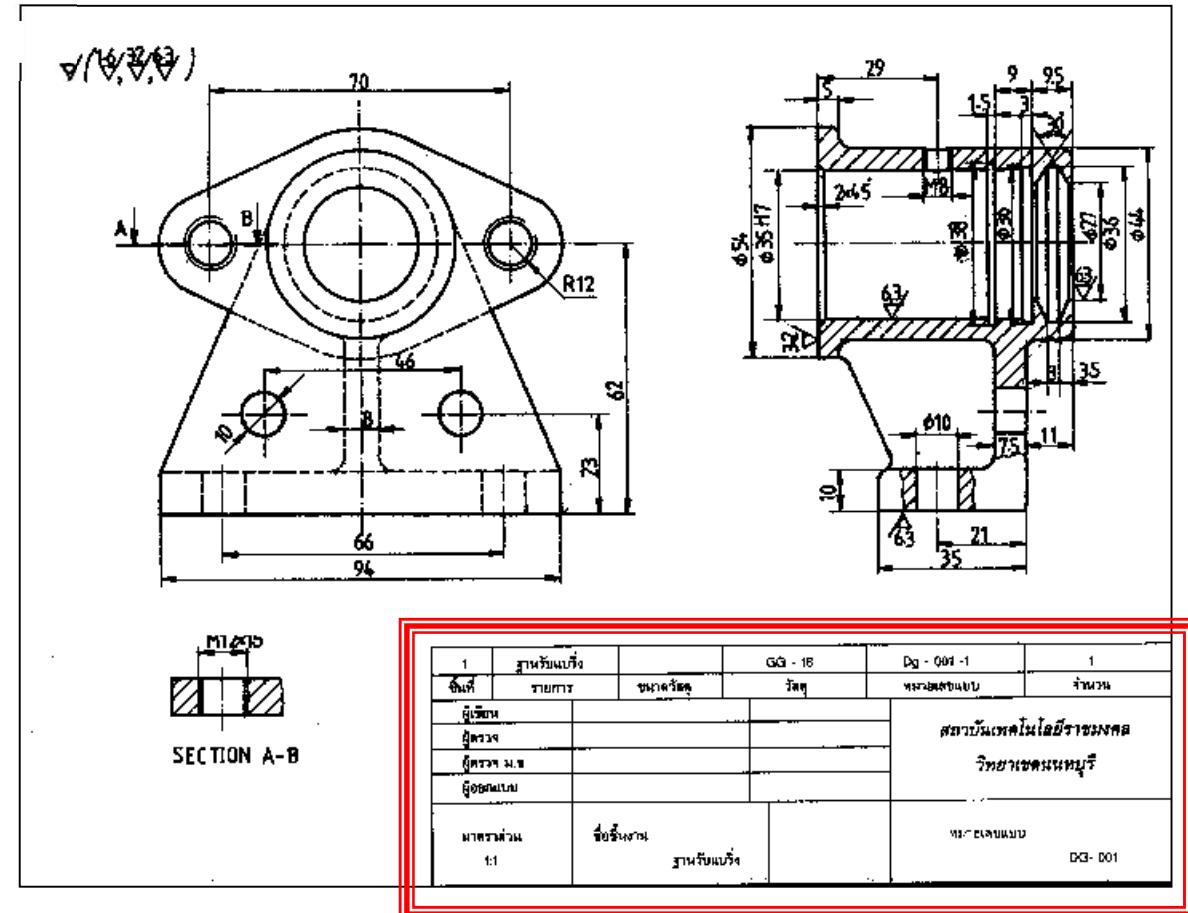
$$A6 = 105 \times 148$$



ตารางรายละเอียด

แสดงรายละเอียดที่
จำเป็น

- ชื่อผู้เขียน
ผู้ออกแบบ
ผู้ตรวจ
- หมายเลขแบบ ,
วัสดุ
- วันที่เขียนแบบ ,
แก้ไข



มาตราส่วนที่ใช้ในงานเขียนแบบ DIN ดูบเจริ่ง 1:1 ISO 5455

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ຢູ່ອາໄຫດ 1:2 1:20 1:200 1:2,000 1:5 1:50 1:500 1:5,000

