

Photogrammetry (CE 474) [3]

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Units and Scale in Photogrammetry

1. Length and distance units

2. Area units

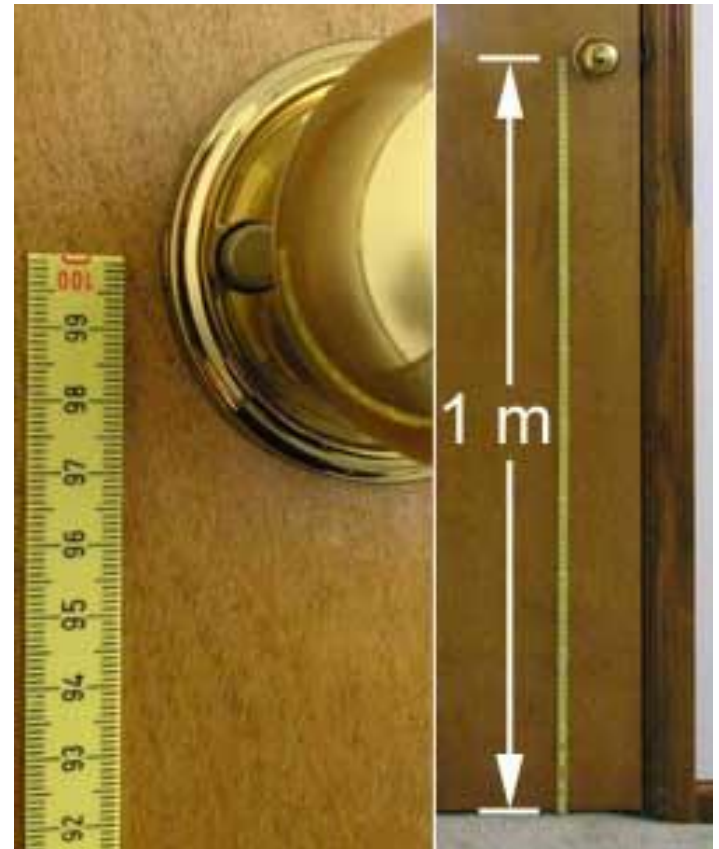
3. Volume units

4. Angles units

4.1 Degree (DEG)

4.2 Grad (GRD)

4.3 Radian (RAD)



1. Length and distance units

1) Metric units

Quantity measured	Unit	Symbol	Relationship		
Length, width, distance, thickness, girth, etc.	millimeter	mm	10 mm	=	1 cm
	centimeter	cm	100 cm	=	1 m
	meter	m			
	kilometer	km	1 km	=	1000 m

Metric Units

1 meter = ?

kilometer (km)	0.001
decimeter (dm)	10
centimeter (cm)	100
millimeter (mm)	1,000
micrometre (micron)	1,000,000
Nanometer (nm)	1,000,000,000
angstrom	10,000,000,000

British and U.S Units

1 mile (mile)	1760 yard
1 yard (yd)	3 foot
1 foot (ft)	12 inch
1 inch (in)	2.54 cm

IS Units	Metric Units
Ft = 12 inch	1m = 100 cm
Yard = 3 foot	1dc = 10 cm
Mile = 1760 yard	1 cm = 10 mm
1 Inch = 2.54 cm	1 km = 1000 m

Area Units

Unit in square meters

Metric Unit System

square millimeter [mm²] 0.000001

square centimeter [cm²] 0.0001

square decimeter [dm²] 0.01

square meter [m²] 1

square kilometer [km²] 1000000

are [ar] 100

hectare [ha] 10000

Imperial and US Unit System

square inch [in²] 0.00064513460025

square foot [ft²] 0.09290304

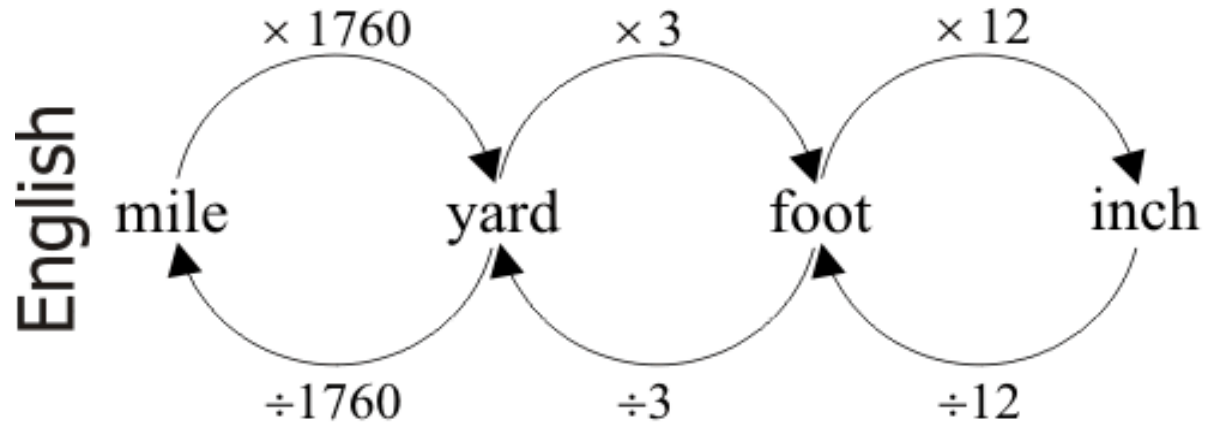
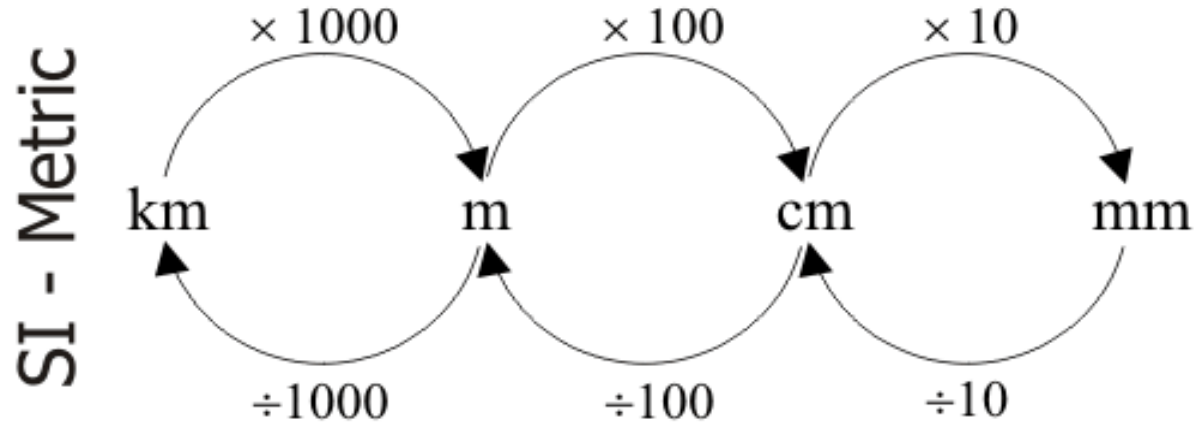
square yard [yd²] 0.83612736

square mile [mi²] 2589886.1433037824

Feddan **4200.83**

Check

Multiply to change larger units to smaller units.



Divide to change smaller units to larger units.

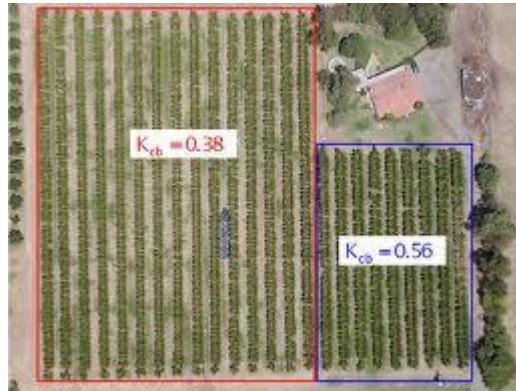
1 sq. mile 616.54 Feddan

1 sq. km 238.05 Feddan

1 hectare 2.38 Feddan

Volume Units

Volume is the quantity of three-dimensional space enclosed by some closed boundary



1 liter = $(10 \text{ cm})^3 = 1000 \text{ cubic centimeters} = 0.001 \text{ cubic meters}$,

1 cubic meter = 1000 liters

1 millilitre = 0.001 litres = 1 cubic centimètre

4. Angles units

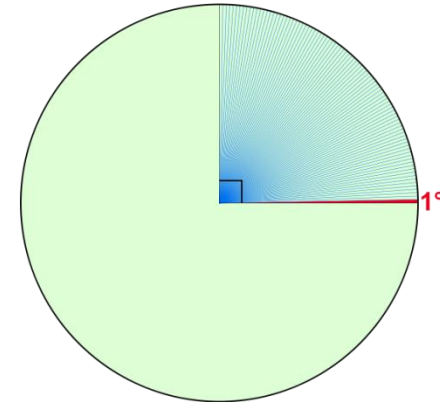
Angles Systems

Degree (DEG)

is a measurement of plane angle, representing $\frac{1}{360}$ of a full rotation

Grad (GRD) 400

Radian (RAD) = 2π



0°	=	0 gon
90°	=	100 gon
180°	=	200 gon
270°	=	300 gon
360°	=	400 gon

4. Angles units

Units	Values							
Degrees	0°	30°	45°	60°	90°	180°	270°	360°
Radians	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	π	$3\pi/2$	2π
Grads	0^g	$100^g/3$	50^g	$200^g/3$	100^g	200^g	300^g	400^g

How to convert degree minutes seconds angle to decimal?

Convert: 2 degrees, 45 Minutes and 20 seconds to decimal:

20 seconds = 0.33 minutes (i.e. $20/60$); add to 45 minutes to get 45.33 minutes.

45.33 minutes = $45.33/60$ degrees = 0.7555 degrees.

Therefore, final answer is $2 + 0.7555 = 2.7555$ degrees

Golden Rule

DEG

GRD

RAD

360

400

2π

24 27 15.3

X

Y

$$X = (24 \ 27 \ 15.3) * 400 / 360$$

$$Y = (24 \ 27 \ 15.3) * 2\pi / 360$$