

# **Automotive Workshop AUTO 109**

## **Introductory Lesson**

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# Systems of units for Length Measurements

- **Metric**
- **Imperial**

<b>Metric</b>		<b>Imperial</b>
1 millimetre [mm]		0.03937 in
1 centimetre [cm]	10 mm	0.3937 in
1 metre [m]	100 cm	1.0936 yd
1 kilometre [km]	1000 m	0.6214 mile

<b>Imperial</b>		<b>Metric</b>
1 inch [in]		2.54 cm
1 foot [ft]	12 in	0.3048 m
1 yard [yd]	3 ft	0.9144 m
1 mile	1760 yd	1.6093 km

## Exercise 1

**Example: Convert a length  $L = 3.25$  in to its equivalent value in millimeters.**

**Solution:  $1 \text{ in} = 25.4 \text{ mm}$**

$$L = 3.25 \text{ in} \times (25.4 \text{ mm/in})$$

$$L = 82.55 \text{ mm}$$

## Exercise 2

**Example: Convert a length  $L = 3$  ft to its equivalent value in millimeters.**

**Solution:  $1 \text{ ft} = 12 \text{ in} = 3 \times 12 \text{ in} = 36 \text{ in}$**

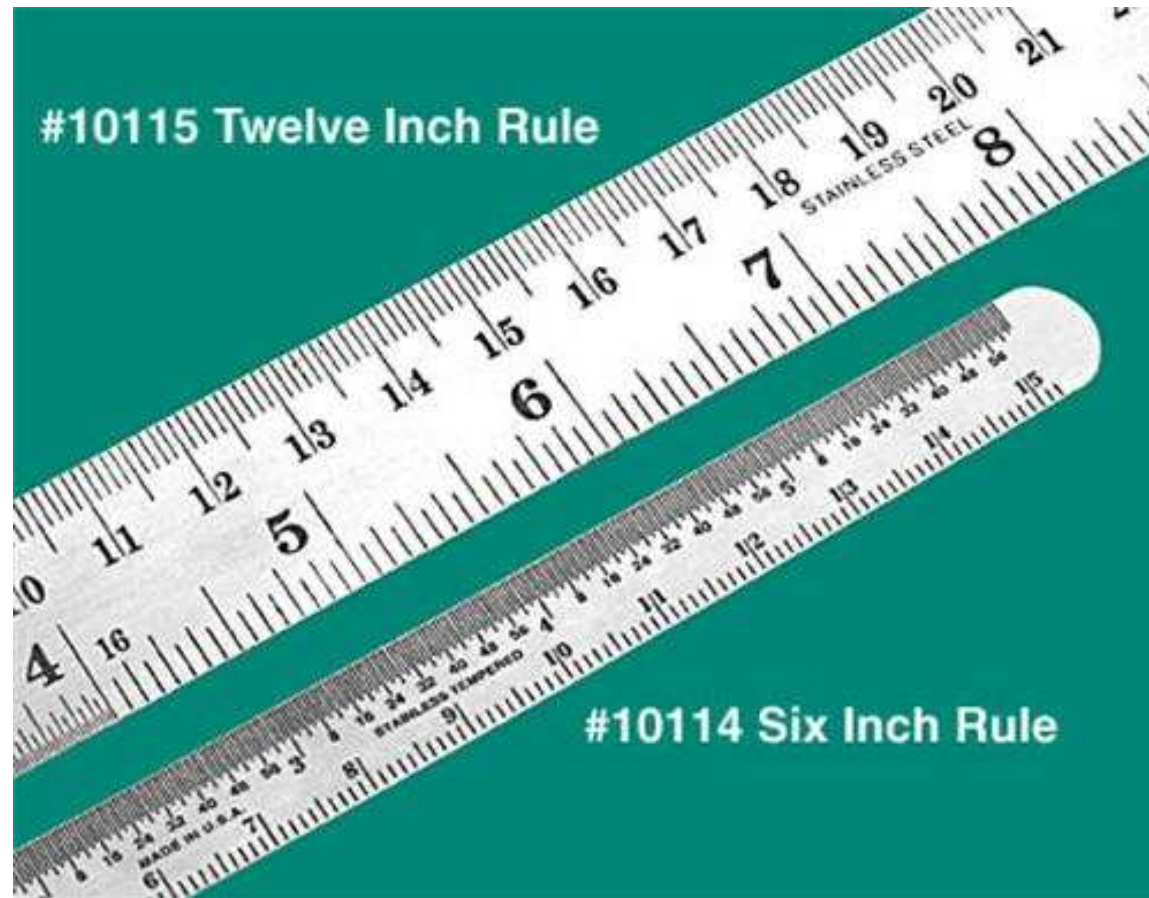
**$L = 36 \text{ in} \times (25.4 \text{ mm/in})$**

**$L = 914.41 \text{ mm}$**

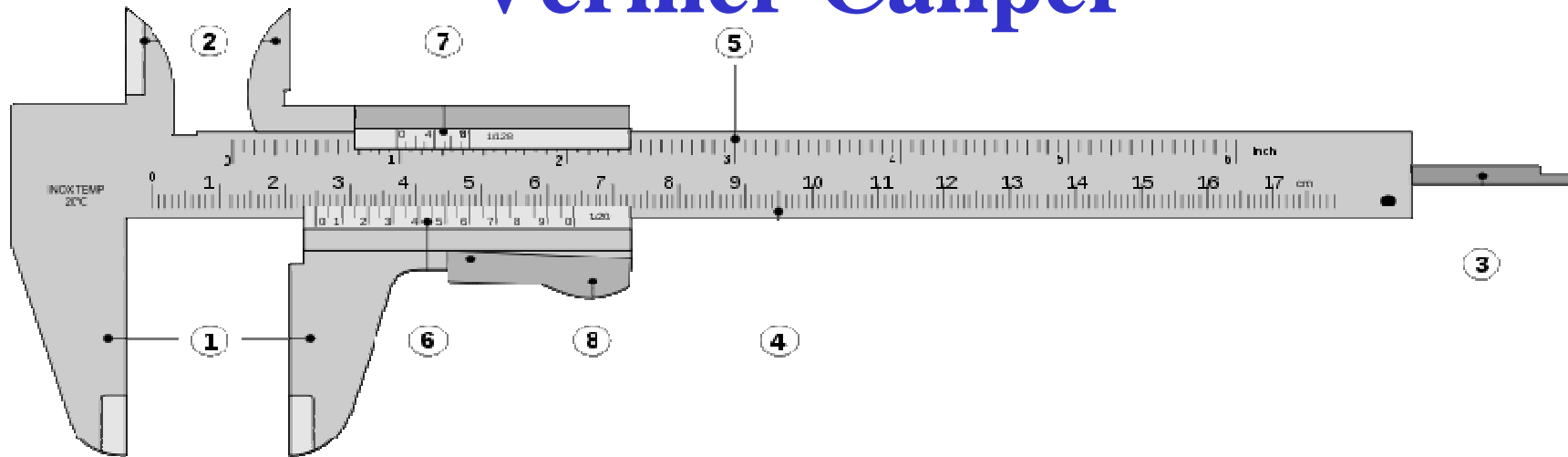
# **Instruments for measuring Length**

- **Machinist's rule**
- **Vernier Caliper**
- **Micrometer**

# Machinist's rule

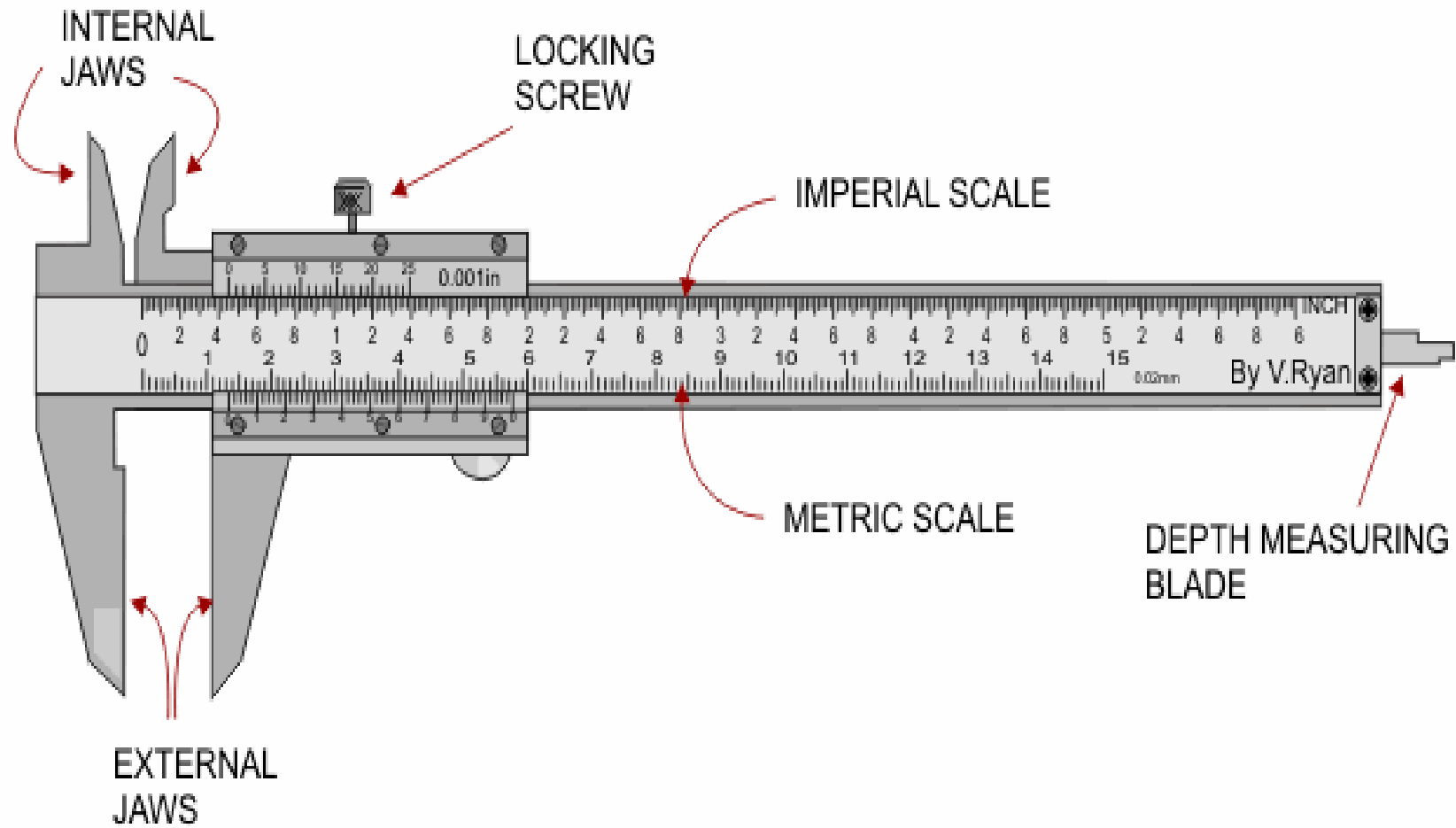


# Vernier Caliper



1. Outside jaws: used to measure external length
2. Inside jaws: used to measure internal length
3. Depth probe: used to measure depth
4. Main scale (cm)
5. Main scale (inch)
6. Vernier (cm)
7. Vernier (inch)
8. Retainer: used to block/release movable part

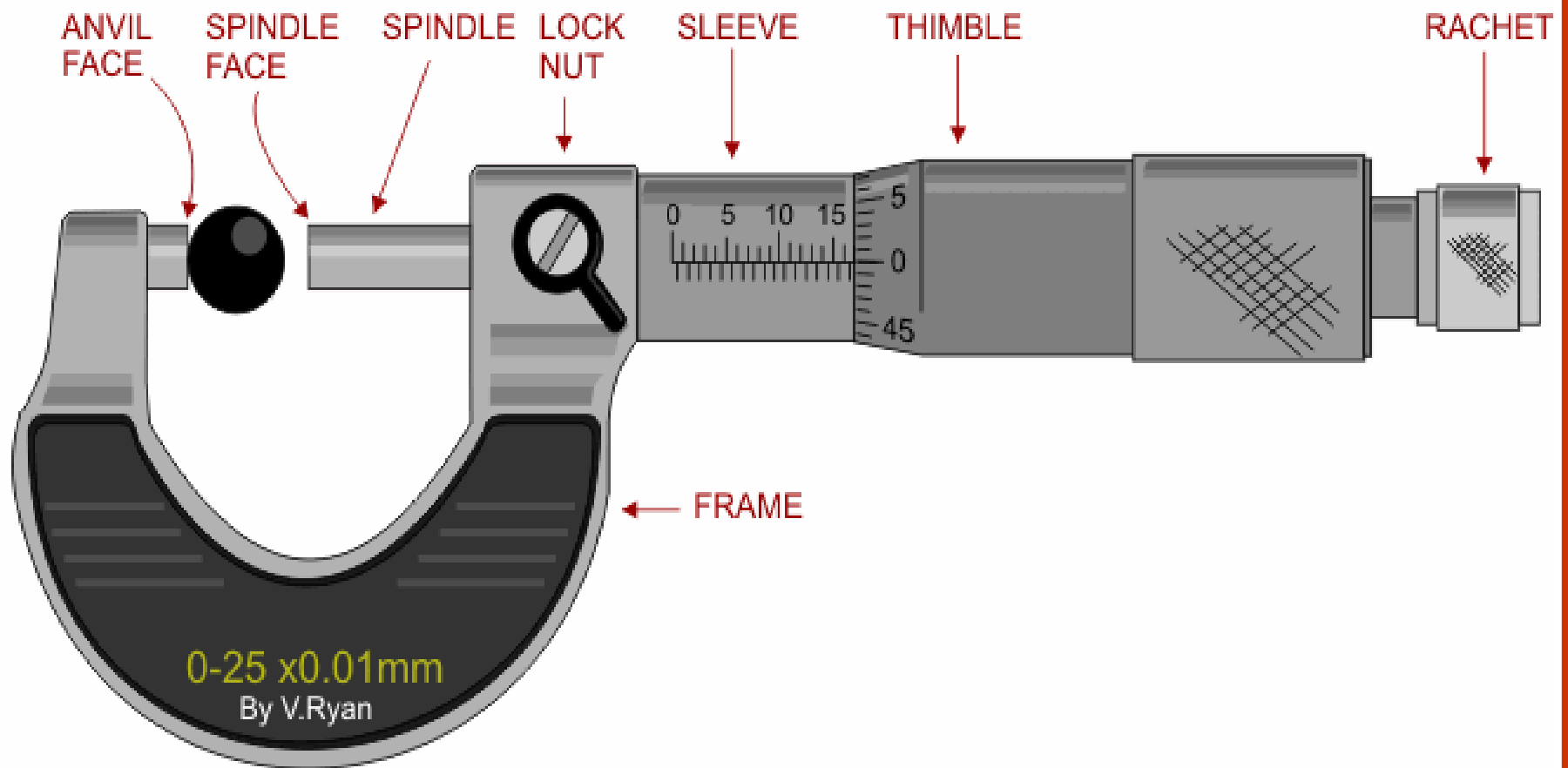
# Vernier Caliper



# Digital Caliper



# Micrometer



# Digital Micrometer



# Vernier Caliper Tutorial

[Start Simulation](#)

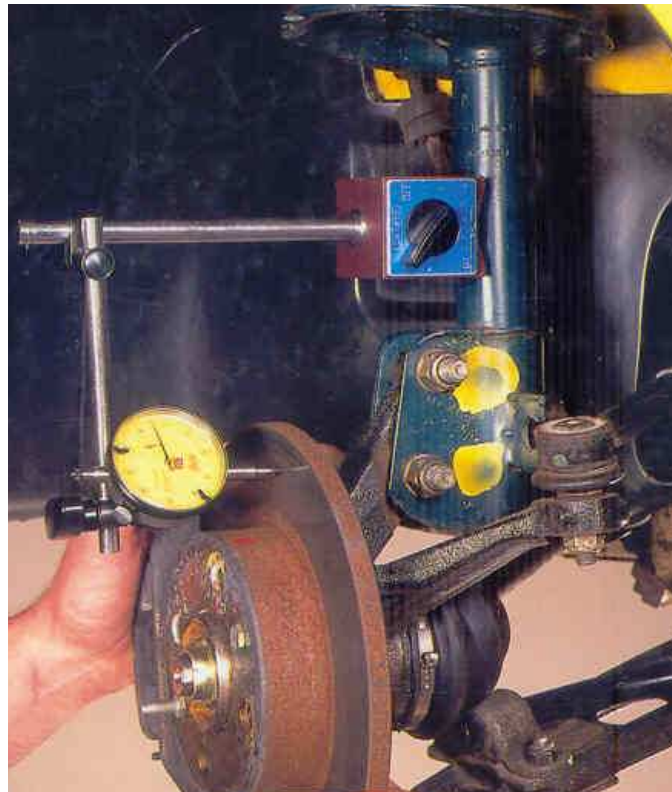
# Micrometer Tutorial

[Start Simulation](#)

# DIAL INDICATOR



## DIAL INDICATOR



**Magnetic base holder can be used in conjunction with dial indicators to measure surface variations like on an automotive disc brake.**