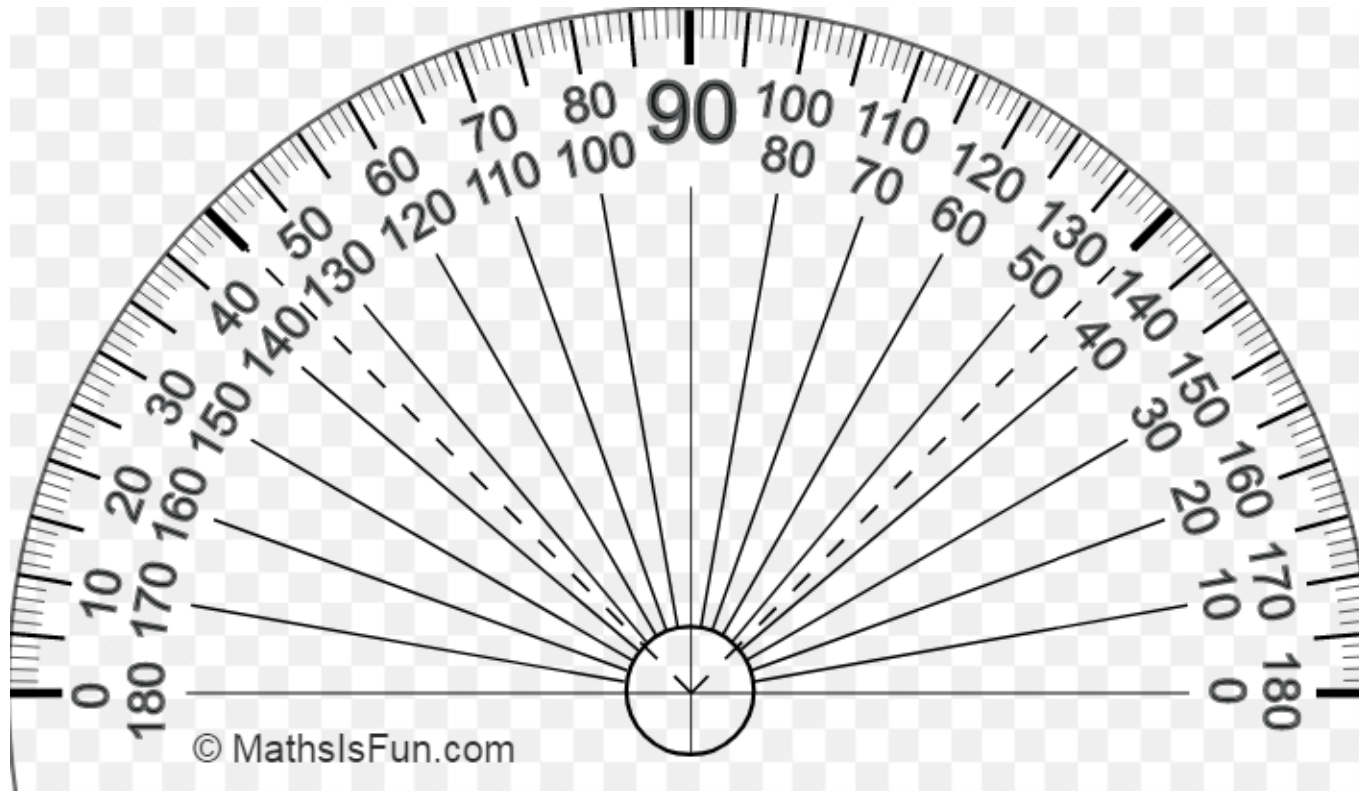


Measuring & Setting Angles



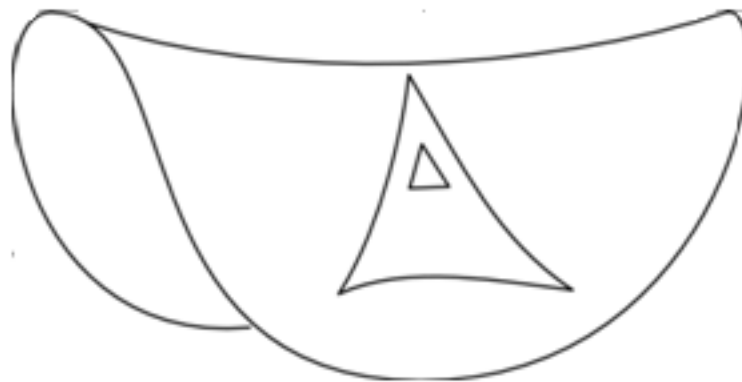
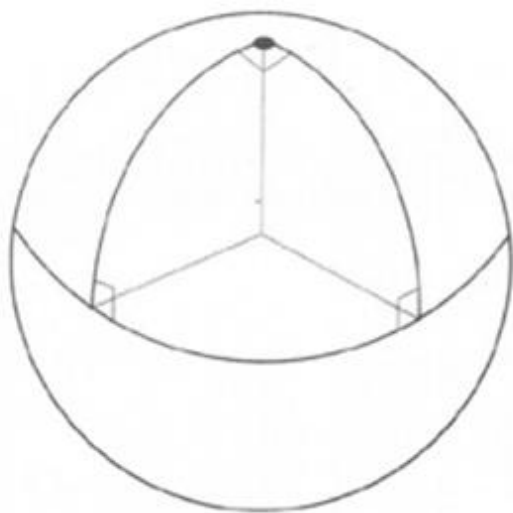
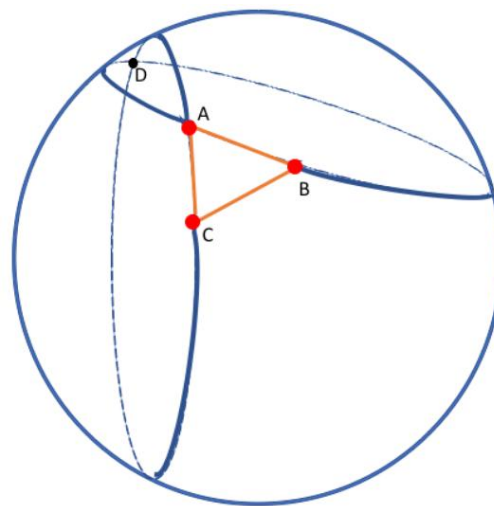
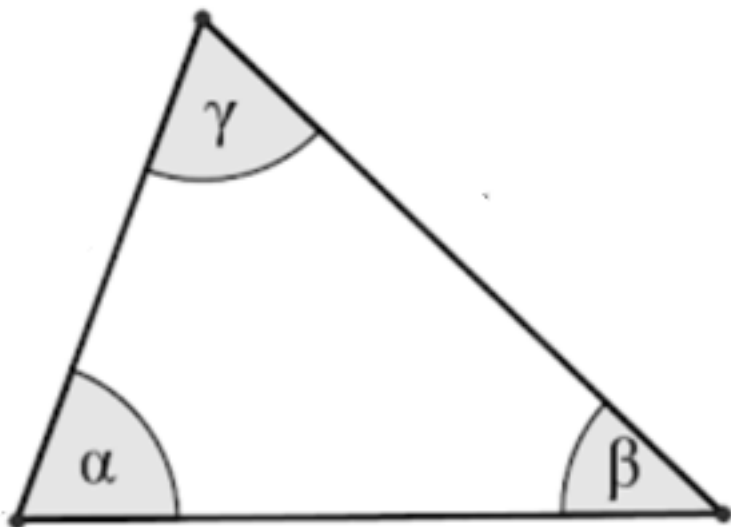
Dick Kostelnicek

3-9-2019

Angles

- Angle is the positional relationship between two straight lines
- Angles are independent of length scale
- Angles depend on the curvature of space

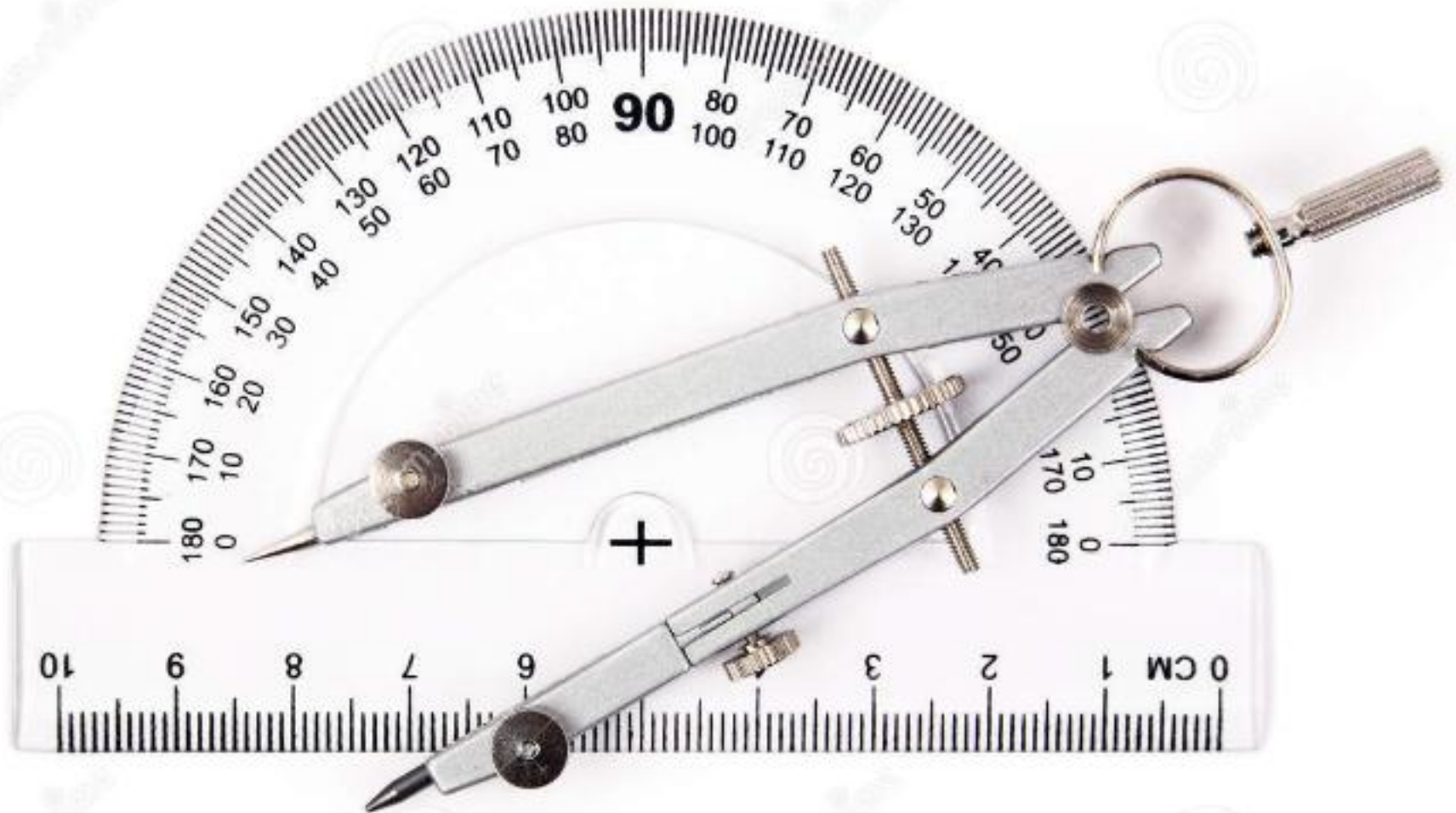
Angles and Space Curvature



Methods for Measuring Angles

- **Empirical** – directly matching angle to a standard
- **Abstract** - infer angle from indirect measurements

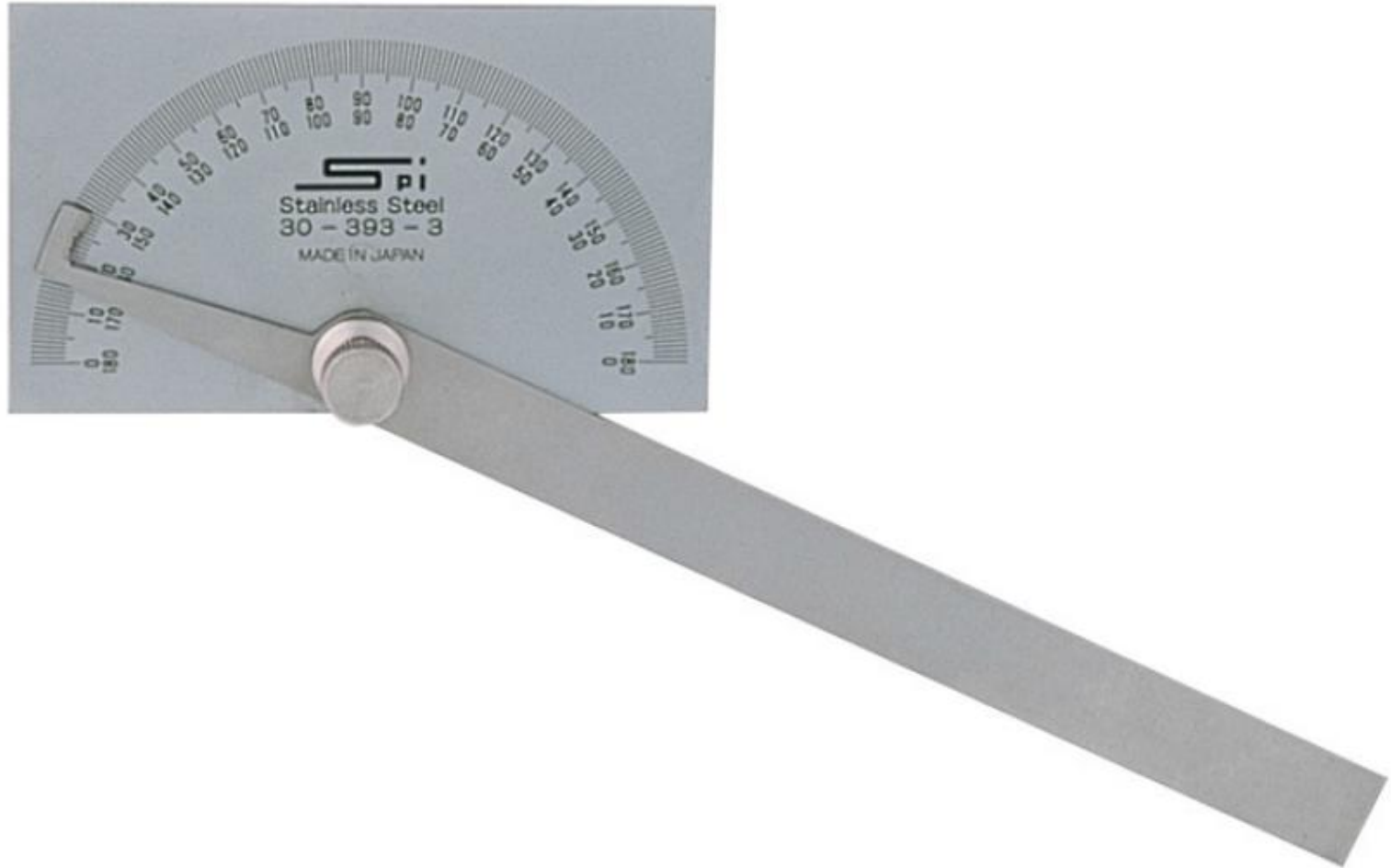
Protractor



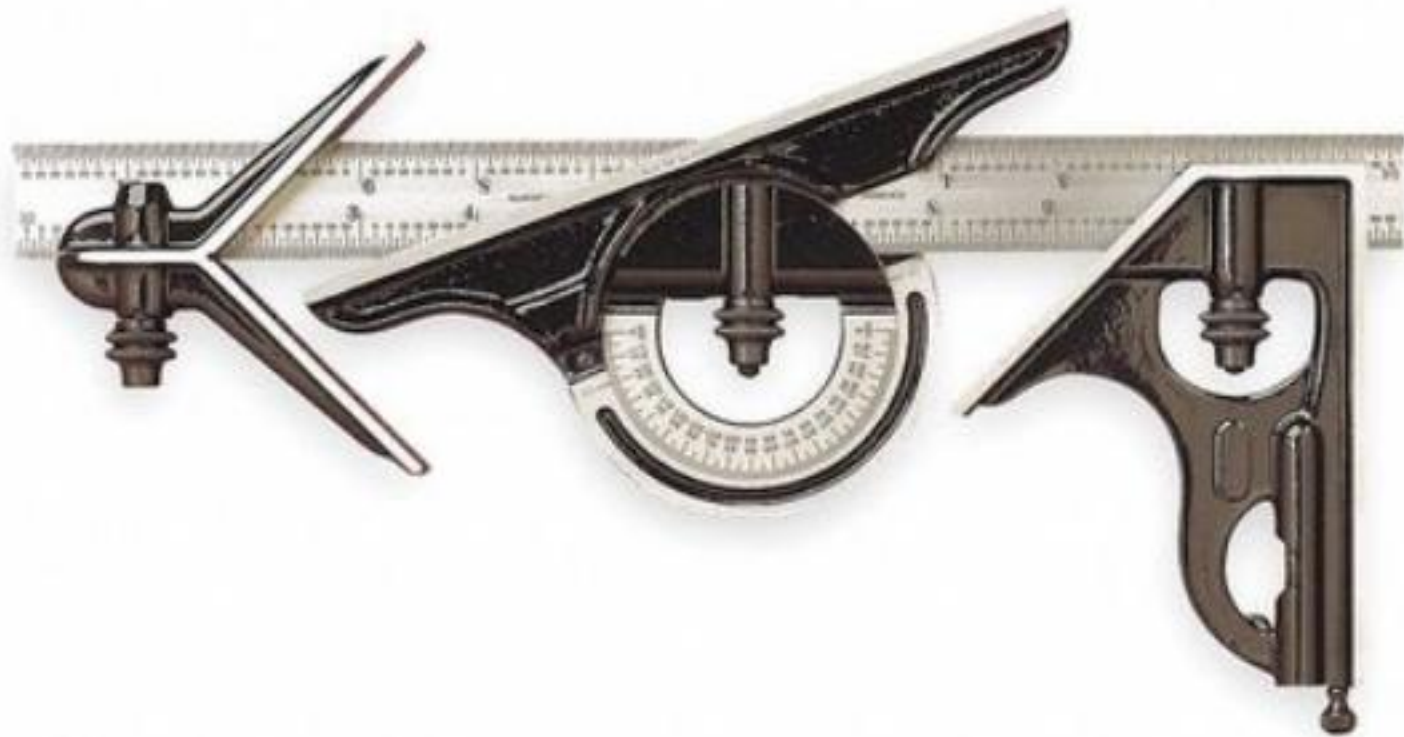
B&S Draftsman's Protractor



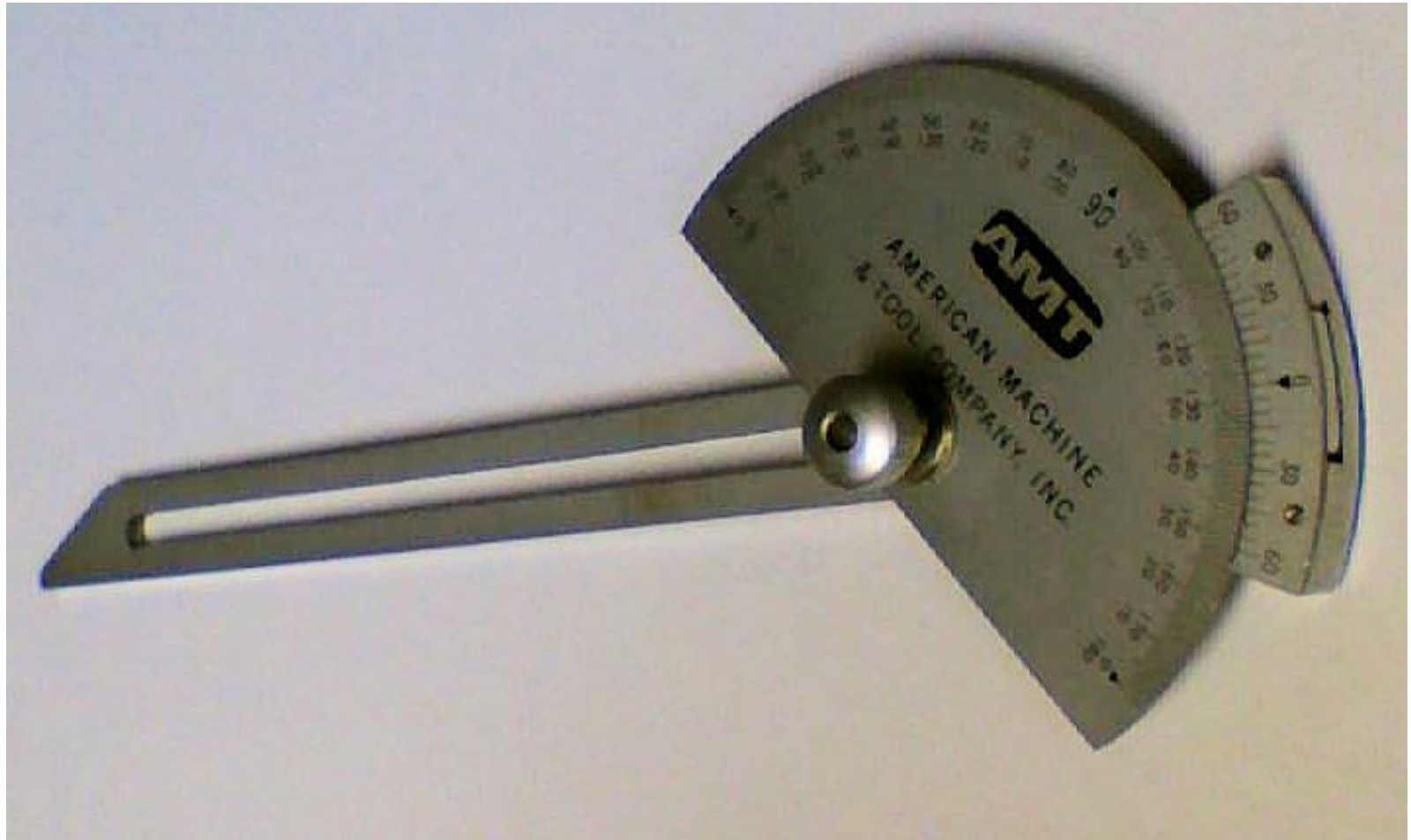
Protractor with Rectangular Protractor Head



Combination Square & Protractor



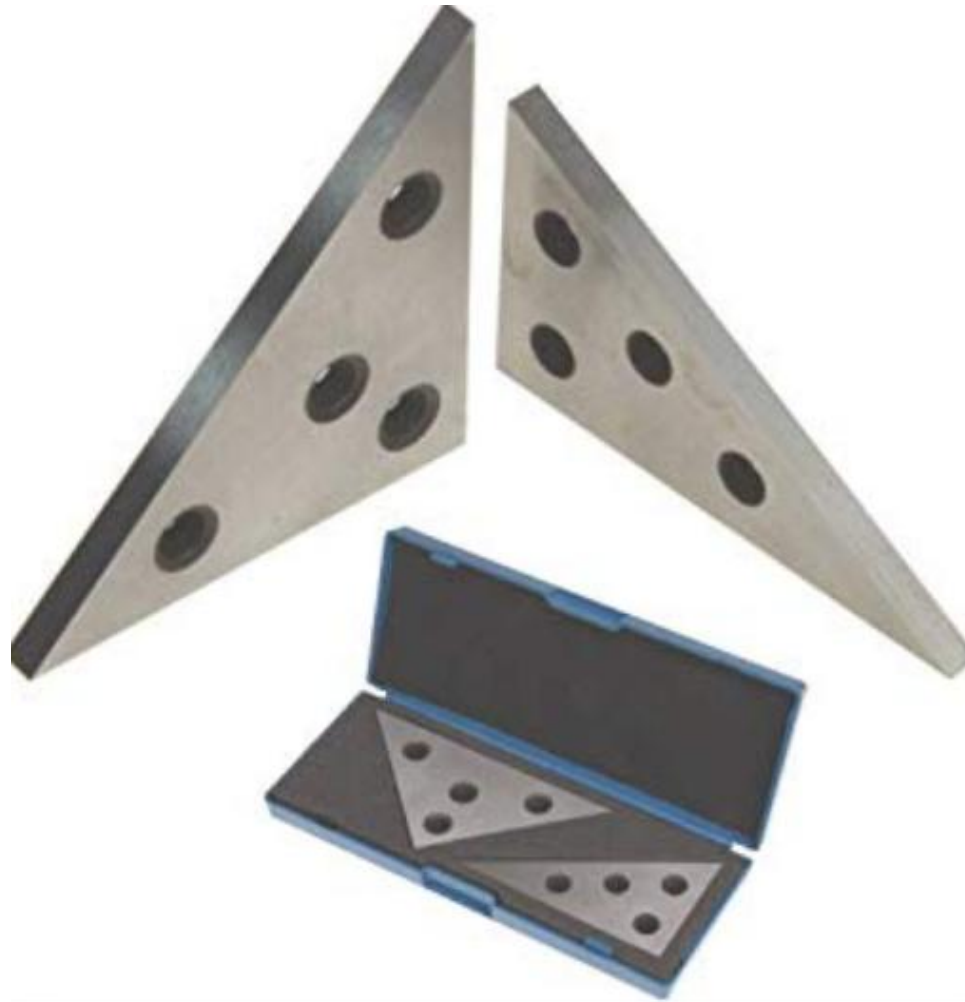
AMT Vernier Protractor



Angle Block Set

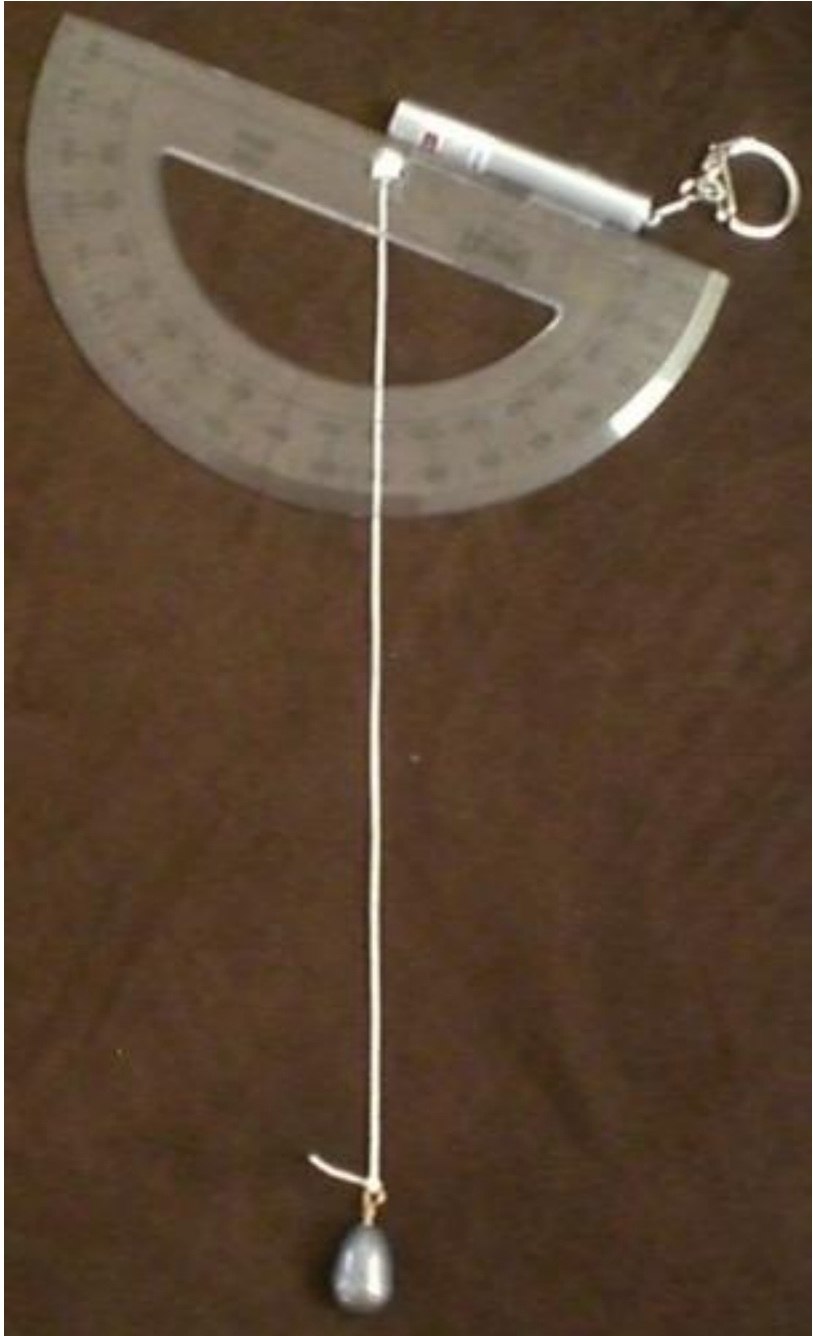


Solid Angle Plates 30-60 + 45



Abstract

Infer angle from indirect
measurements



Protractor Angle Finder

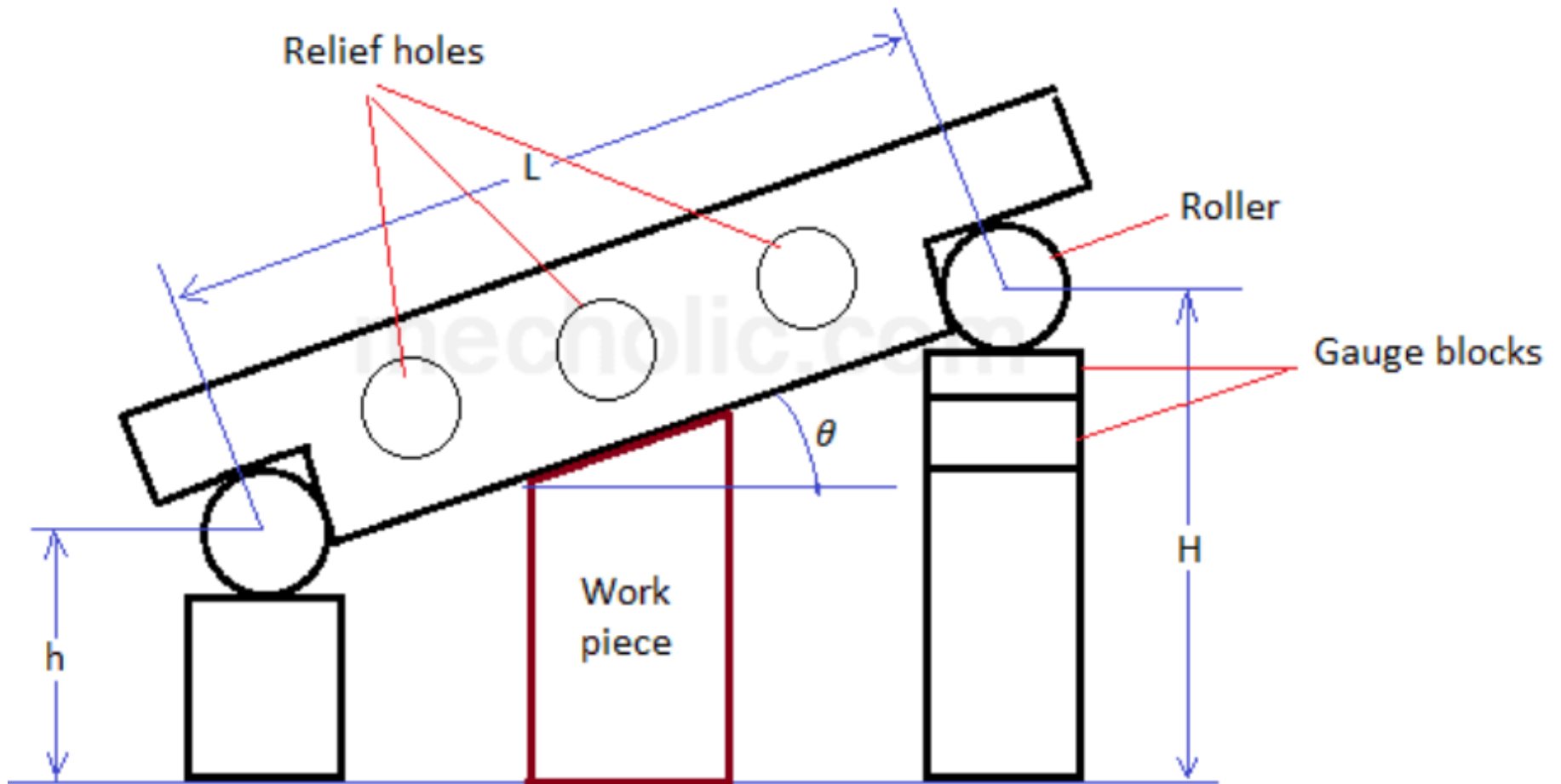


Electronic Accelerometers

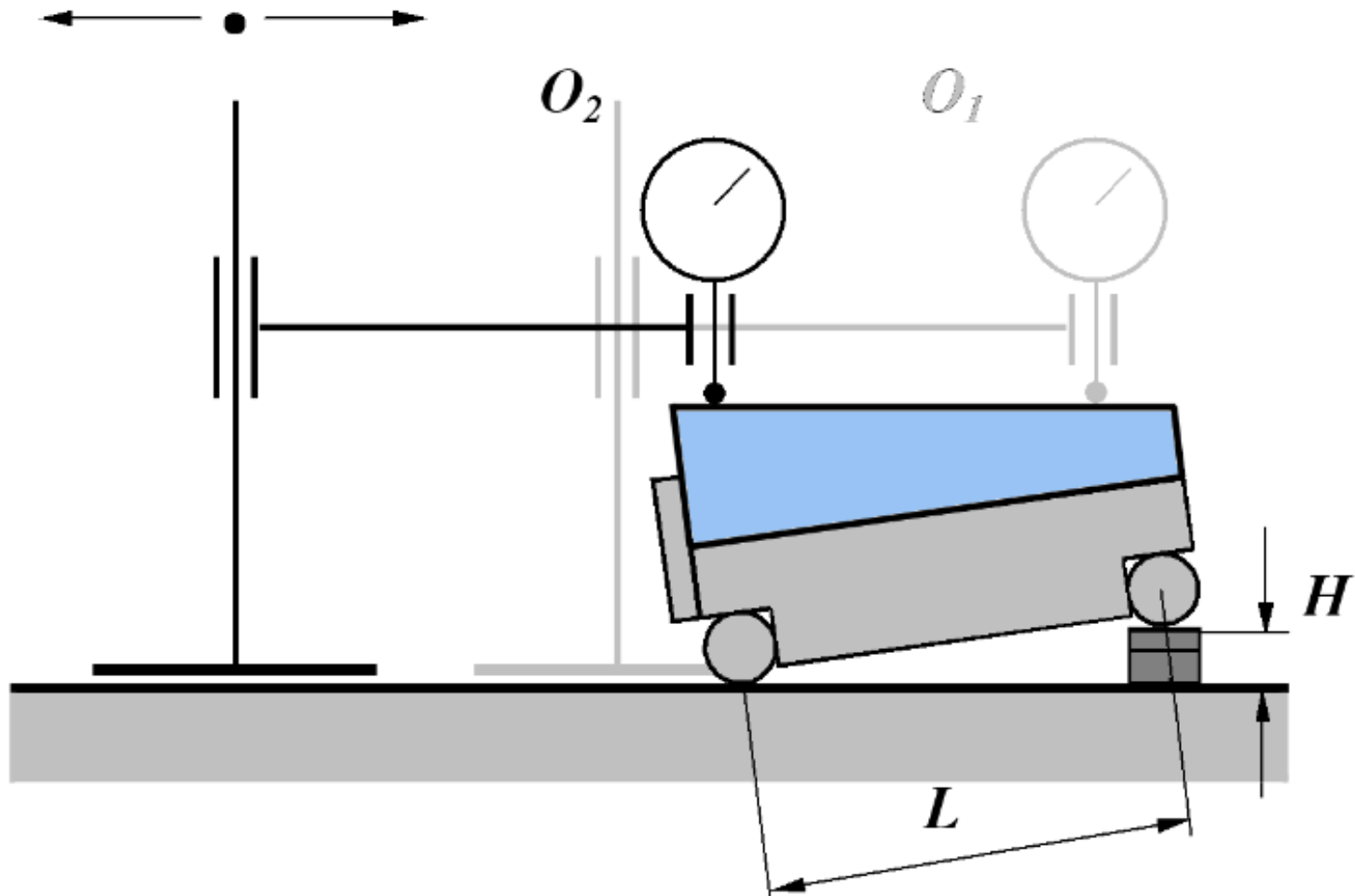


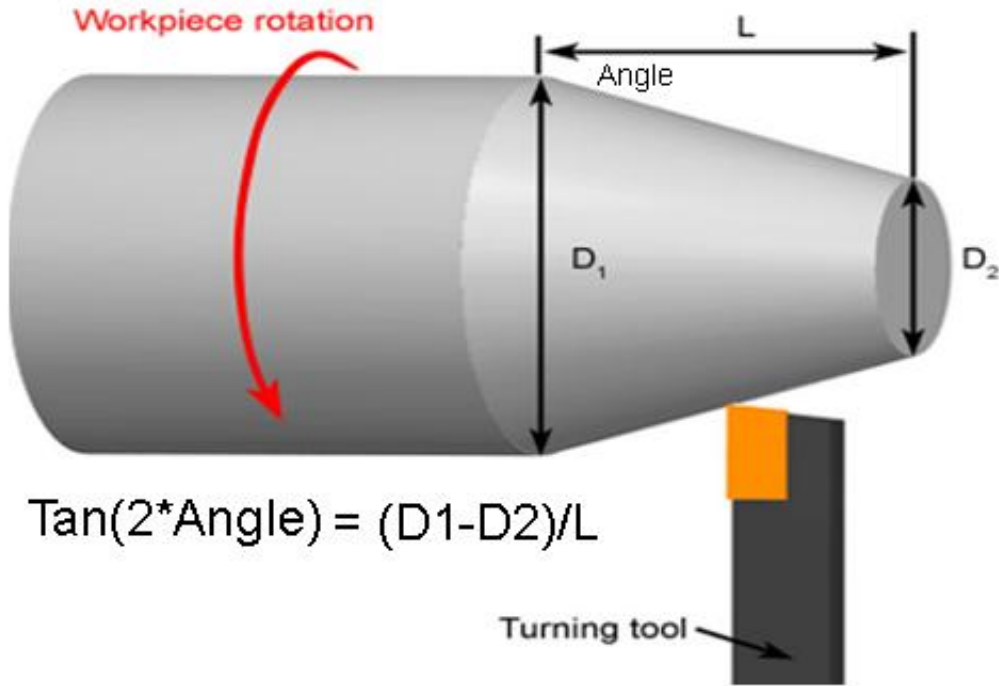
Measuring range: 360° (4 x 90°) • Resolution: $.05^{\circ}$ • Accuracy: $\pm .1^{\circ}$
• Repeatability: $\pm .1^{\circ}$

Sine Bar



Measuring Tapers





Question:

How would you measure or verify a taper that is set up on-axis in a lathe?

End