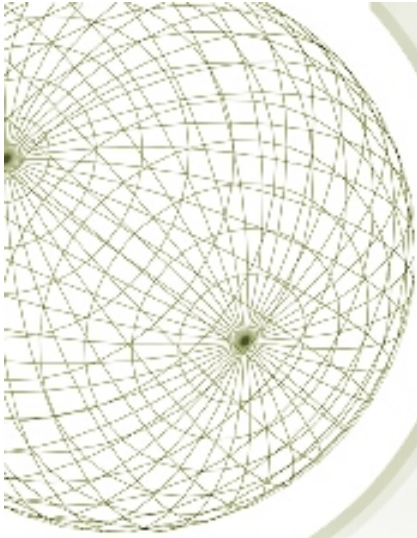


The Tangent Method

How to construct an angle
without a protractor



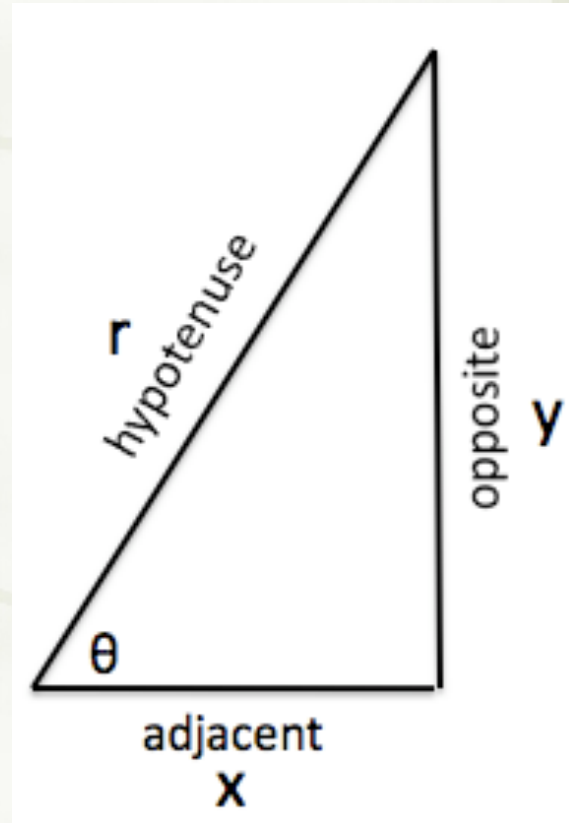
How it Works

The ratio of the sides of a right triangle are named sin, cos, and tan. SOHCOATO

From the definition of tangent:

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}} = \frac{y}{x}$$

$$\text{so } y = x \cdot \tan \theta$$

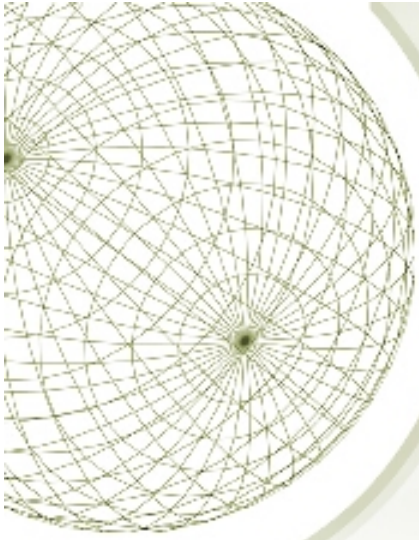


This simple fact is the basis of the *Tangent Method*. Any distance for x and it would work, but we chose 10 cm because it's easy and fits on a piece of graph paper nicely.



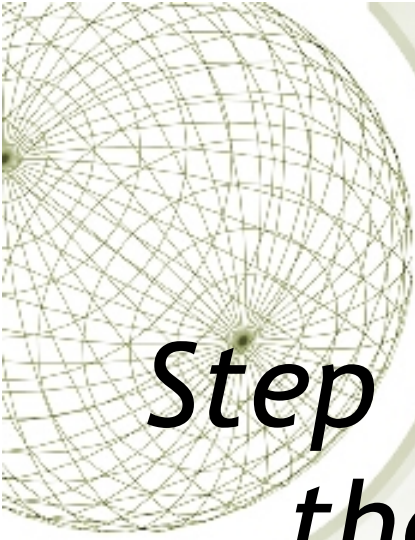
How to use the Tangent Method

1. Use your calculator to find the tangent of the angle you wish to construct.
2. Multiply the tangent of the angle by 10 cm.
3. Draw a 10 cm line horizontally on your graph paper.
4. Now draw a vertical line from the right tip of the horizontal line the number of centimeters you calculated in Step 2.
5. Connect the two end points to form a right triangle. The hypotenuse and the horizontal line form the desired angle.



Example

Use the tangent method to draw
an angle of 37 degrees.

A decorative wireframe sphere is positioned in the upper-left corner of the slide. The sphere is composed of a grid of thin, light-colored lines that form a spherical shape, with a slight shadow beneath it.

*Step 1: Use a calculator to find
the tangent of 37 degrees*

$$\tan 37^\circ = 0.754$$



*Step 2: Multiply the tangent
of 37 degrees by 10 cm*

$$\tan 37^\circ = 0.754$$

$$10\text{cm} \times \tan 37^\circ = 7.54\text{cm}$$




*Step 3: On graph paper,
measure out 10 centimeters
horizontally*



10 cm





Step 4: Measure out vertically the number of centimeters found in Step 2

In step 2, we found that $10\text{cm} \times \tan 37^\circ = 7.54\text{cm}$



7.54 cm

A right-angled triangle is shown with a horizontal base of 10 cm and a vertical height of 7.54 cm. The hypotenuse is the slanted side of the triangle.

10 cm



Step 5: Connect the endpoints. You now have a line at the desired angle.

