

## Measurement of the circle

Every circle is equal to a right-angled triangle, whose radius is equal to one [of the sides] around the right angle, while the perimeter is equal to the base.

Let the circle  $AB\Gamma\Delta$  be to triangle  $E$  as hypothesized. I say that it is equal.

For if it is possible, let the circle be greater, and let the square  $A\Gamma$  be inscribed, and let the arcs be cut in two, and let the segments finally be less than the excess by which the circle exceeds the triangle. Therefore the rectilinear figure is still greater than the triangle. Let the center  $N$  be taken, and perpendicular  $N\Xi$ . Therefore  $N\Xi$  is less than the side of the triangle. But also the perimeter of the rectilinear figure is less than the remaining [side], since it is also less than the perimeter of the circle. Therefore the rectilinear figure is less than the triangle  $E$ , which is impossible.

And let the circle, if possible, be less than the triangle  $E$ , and let the square be circumscribed, and let the arcs be cut in two, and let tangent lines be drawn through the points. Therefore the angle  $OAP$  is right.  $OP$  is therefore greater than  $MP$ : for  $PM$  is equal to  $PA$ . And the triangle  $PO\Pi$  is therefore greater than half the figure  $OZAM$ . Let there remain the [sections] similar to the section  $\Pi ZA$ , less than the excess by which  $E$  exceeds the circle  $AB\Gamma\Delta$ . Further, therefore, the circumscribed rectilinear figure is less than  $E$ , which is impossible. For it is greater, because  $NA$  is equal to the perpendicular of the triangle, but the perimeter is greater than the base of the triangle.

Therefore the circle is equal to the triangle  $E$ .