

A Human Introduction to Geometry

Reading Quiz 2

Spring 2017
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1. Which of Euclid's Postulates was the most controversial?

Postulate 5 (The Parallel Postulate)

2. Who proved the *Theorema Egregium* and (approximately) when did he live?

Carl Friedrich Gauss lived from 1777 to 1855. I gave full points for any year between 1727 and 1895.

3. Name a surface that has constant **positive** curvature and a surface that has constant **zero** curvature.

The surface of a sphere has constant positive curvature.

A flat plane has constant sectional curvature zero. A cylinder has some non-zero sectional curvature, but its Gaussian curvature is constantly zero.

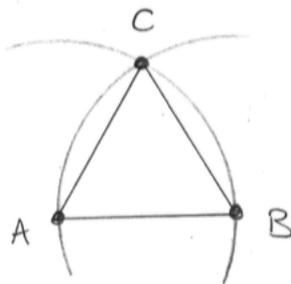
4. Consider a geodesic triangle with interior angles α, β, γ lying on a surface with constant curvature κ . Fill in the blanks:

If $\kappa > 0$ then $\alpha + \beta + \gamma \geq 0$.

If $\kappa = 0$ then $\alpha + \beta + \gamma \equiv 0$.

If $\kappa < 0$ then $\alpha + \beta + \gamma \leq 0$.

5. Given a line segment AB , show how to construct an **equilateral triangle** ABC using just a straightedge and compass. (A sketch is okay if you don't have a straightedge and compass handy.)



6. (Bonus) Given a line segment AB , show how to construct a line segment **perpendicular** to AB using a straightedge and compass.

