

Esame di Lingua Inglese (1.5 ore)

Non-Euclidean geometries

One way to think of hyperbolic geometry is as the geometry that you would see if you lived on a hyperbolic surface. Without being mathematically exact, think about the surface of a saddle for a horse: it slopes up in front and behind you, and down where your legs go. The surface of a saddle is roughly the same as a hyperbolic surface.

Now imagine an ant on the saddle which is walking between two points on the surface by the shortest possible route. We humans can see that the ant is moving along a curved path: this will be called a “straight line” in hyperbolic geometry.

Now imagine three points on the saddle A, B and C and imagine that the ant walks in hyperbolic straight lines from A to B, then from B to C and finally, from C back to A. This path will trace out a “triangle” in hyperbolic geometry.

But to us humans it will seem to be like a triangle with the middle parts of the lines bent in toward the center. Thus the angles at the tips will be less than what they are for usual Euclidean triangles. So, if you add all three, the sum will be less than 180 degrees, the sum for a Euclidean triangle.

If you have trouble visualizing paths like this on a saddle, try doing it on a sphere (like the surface of the earth). This will be spherical geometry, which has the opposite property: in spherical geometry, the sum of the angles of a triangle will be more than 180 degrees.

1. SELEZIONARE IL CORRETTO COMPLETAMENTO

1. In hyperbolic geometry the sum of the angles in a triangle (is) (is not) (are) (are not) less than 180 degrees.
2. An angle in a hyperbolic triangle appears to be smaller (of) (that) (than) the corresponding Euclidean angle.
3. In spherical geometry the sum of the angles in a triangle (can) (must) (cannot) be 270 degrees.
4. Two straight lines are parallel if (they) (them) (there) have no points in common. On a spherical surface all straight lines meet, (so) (but) there are no parallel lines!

2. TRADURRE IN INGLESE LE FRASI SEGUENTI

1. Cosa è un triangolo?
2. Quanto vale la somma degli angoli di un triangolo?
3. Su una superficie iperbolica la somma degli angoli di un triangolo è meno di 180 gradi.
4. Due rette sono parallele se non hanno punti in comune.

3. TRADURRE IN ITALIANO IL TESTO