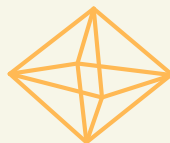
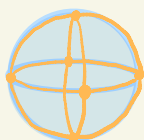
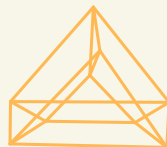
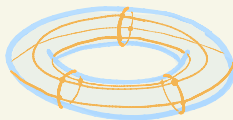


9. The Euler characteristic

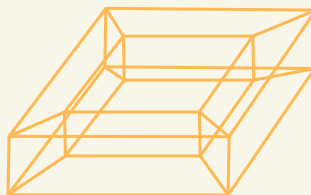
Surface \rightsquigarrow "Inflated" Polyhedron \rightsquigarrow Polyhedron (aka polygon mesh)



or



...



Surface



Polyhedron
(aka polygon mesh)

V

E

F

χ



6

12

8

0

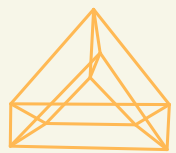


4

6

4

0

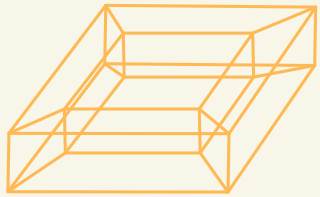


9

11

9

0



16

32

16

0

Q?

The Euler characteristic of a surface S is

$$\chi(S) = V - E + F$$

for any deflated polyhedron for S with

$$V = \# \text{vertices}$$

$$E = \# \text{edges}$$

$$F = \# \text{faces}$$

Theorem (Legendre, 1700s): the Euler characteristic is independent of the choice of polyhedron.

Your first task today: Conjecture and prove a formula for $\chi(T_g, b)$