

Mini test - Solutions

The purpose of this mini test is to give you the opportunity to *recall some basic concepts and formulas from the lecture*. Participation is *voluntary* and will *not affect your grade*, but I will look at your answers to see if there is any area where there are still problems.

Write your solutions next to the questions. We will start discussing the solutions in about *10 minutes*.

Question: What is the genus of ...

1. ... the complex projective line \mathbb{CP}^1 ? $g = 0$
2. ... the curve \mathbb{C}/Λ for a lattice $\Lambda \subset \mathbb{C}$? $g = 1$
3. ... a double cover of \mathbb{CP}^1 branched over 12 points? $2g - 2 = 2 \cdot (-2) + 12$, so $g = 5$
4. ... a curve C with $H^1(C, \mathbb{Z}) \cong \mathbb{Z}^6$? $g = 3$
5. ... a curve C with $\dim_{\mathbb{C}}(\text{Jac}^0(C)) = 4$? $g = 4$
6. ... a curve C such that there exists (up to scaling) a unique holomorphic differential on C ? $g = 0$; if instead we ask for a unique nonzero differential up to scaling, it is $g = 1$
7. ... the curve C obtained by gluing the sides of a regular 20-gon according to the pattern in the picture below? $g = 5$
8. ... the curve $C = \{X^5 + Y^5 + Z^5 = 0\} \subset \mathbb{CP}^2$? $g = (d-1)(d-2)/2 = (5-1)(4-1)/2 = 6$
9. ... the curve $C = \{X^3Y + Y^3Z + Z^3X = 0\} \subset \mathbb{CP}^2$? [You can assume without proof that C is smooth and connected.] $g = 3$

