Lecture 9: Quiz

Problem 1

Which of the following letters are topologically equivalent to the number 5?

a) S  c) U  d) Q
b) T

Problem 2

Which problem triggered the development of graph theory?

a) The Petersburg paradox.  
b) Finding the Euler characteristic of a polyhedron  
c) The Koenigsberg bridge problem  
d) The Poincaré conjecture

Problem 3

How many regular Platonic solids are there in four dimensions?

a) 6  c) 12  
b) 4  d) 5

Problem 4

Which formula is called Euler’s Gem?

a) \( E - F + V = 2 \)  
b) \( E - V + F = 0 \)  
c) \( E - V + F = 2 \)  
d) \( V - E + F = 2 \)

Problem 5

Which two mathematicians established first that there are 6 platonic solids in four dimensions?

a) Erasistratus  
b) Theaetetus  
c) Alicia Boole Stott  
d) Ludwig Schlaefli

Problem 6

Which Platonic solid is displayed in the picture?

a) Tetrahedron  
b) Cube  
c) Icosahedron  
d) Octahedron

Problem 7

How many different semiregular nonprismatic polyhedra (Archimedian solids) are there in space?

a) 24  c) 13  
b) 2  d) 13

Problem 8

Which of the following surfaces are orientable?

a) The torus  
b) Sphere  
c) The cone  
d) Klein bottle

Problem 9

Which formula was used in the proof that there are exactly 5 platonic solids?

a) \( \frac{1}{m} + \frac{1}{n} = \frac{1}{2} + \frac{1}{e} \)  
b) \( a^2 + b^2 = c^2 \)  
c) The number of edges is always even.  
d) The duality switching faces and vertices

Problem 10

What is the Euler characteristic of the sphere?

a) 2  c) 1  
b) 0  d) -1