

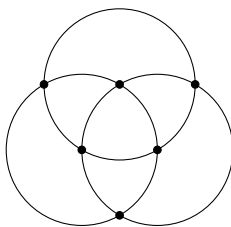
History of Mathematical Ideas

Quiz 4

Name: _____

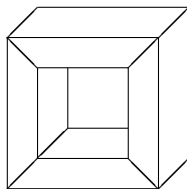
You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Euler's Formula holds for planar drawings of graphs (if you are careful about counting the unbounded region). Show that the formula holds for:



$$v - e + f = 6 - 12 + 8 = 2.$$

2. The following figure is meant to be a nonconvex polyhedron with four quadrilaterals for front faces, four parallel quadrilaterals for back faces, four rectangular faces around the outside and four rectangular faces around the inside. Find the defect at each vertex and report the sum of the defects. (Hint: all outer vertices have the same defect and all inner vertices have the same defect.)



Outer vertices have defect $360 - (45 + 45 + 90 + 90) = 90$. Inner vertices have defect $360 - (135 + 135 + 90 + 90) = -90$. Total defect $= 8(90) + 8(-90) = 0$.