Computational Algebra II, Exercise Sheet 1

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Due: March 30, 2010

Either draw or describe the shape of the following affine varieties in $\mathbb{R}^3$:

1. $V(x^2 + y^2 - 1, z^2 - 1)$. (2 credits)

2. $V(x^2 + y^2 - z^2, z - x - 1)$. (2 credits)

3. $V(x^2 + y^2 + z^2 - 1, xyz)$. (2 credits)

4. $V(xyz(x^2 - y^2)(x^2 - z^2)(y^2 - z^2))$. (2 credits)

5. $V((xyz - 1) \cdot (xyz + 1), x^2 + y^2 + z^2 - 16)$. (4 credits)

6. $V(x^3 + xz^2 - y^2 + z)$. (4 credits)

7. $V(((x^2 + y^2 + z^2 + 3)^2 - 16(x^2 + y^2))$
   $\cdot((x^2 + (y - 2)^2 + z^2 + 3)^2 - 16((y - 2)^2 + z^2)))$. (4 credits)