Midterm-2 for Math 431   **Due Date: 6 May 2022 Friday**

1: Show, in as much detail as possible, why $\mathbb{A}^2 - \{(0,0)\}$ is not affine. Check Internet to see why this is not as trivial as it looks!

2: Show that the quadric surface Q given by $xy = zw$ in $\mathbb{P}^3$ is birational to $\mathbb{P}^2$, but not isomorphic to $\mathbb{P}^2$.

3: Show that every quadratic variety of dimension n is isomorphic to a quadratic hypersurface in $\mathbb{P}^{n+1}$.

Write your solutions on A4 papers and staple them together. Do not use other fancy covers!

Thank you.