

Math 614 Quiz 3

Compute the cardinality of each set below.

- (1) $\text{Spec } \mathbb{R}$
- (2) $\text{Spec } \frac{\mathbb{C}[x,y]}{\langle x^5, y^5 \rangle}$.
- (3) $\text{Spec } \mathbb{Z}_{\langle 5 \rangle}$
- (4) $\text{Spec } (\mathbb{F}_2 \times \mathbb{F}_5 \times \mathbb{F}_7)$
- (5) $\text{Spec } \frac{\mathbb{Z}}{\langle 210 \rangle} \left[\frac{1}{11} \right]$.
- (6) The closed set $\mathbb{V}(30)$ in $\text{Spec } \mathbb{Z}$.
- (7) The inverse image of the closed set $\mathbb{V}(30)$ under the map $\text{Spec } \mathbb{Q} \rightarrow \text{Spec } \mathbb{Z}$ induced by the inclusion $\mathbb{Z} \hookrightarrow \mathbb{Q}$.
- (8) The open set $D(\overline{3})$ in $\text{Spec } \mathbb{Z}/\langle 210 \rangle$.
- (9) The residue field K of the prime ideal $\langle x^2 + 1 \rangle$ in $\mathbb{F}_3[x]$.
- (10) For K as in (9), $\text{Spec } K$.