1. §21, No. 14: The problem is to determine the number of elements in the ring $Q(\mathbf{Z}_4, \{1, 3\})$. However, since 1 and 3 are already units in $\mathbf{Z}_4$, $\mathbf{Z}_4 = Q(\mathbf{Z}_4, \{1, 3\})$. Thus, $Q(\mathbf{Z}_4, \{1, 3\})$ has 4 elements.

2. §26, No. 18: Let $\theta\colon F \to R$ be a homomorphism of rings, where F is a field. Then either θ is injective or $\theta(a) = 0$ for all a. To prove this, recall that the kernel of θ is an ideal I of F. But since F is a field, either $I = \{0\}$ or $I = F$. In the first case, θ is injective, and in the latter case, $\theta(a) = 0$ for all a.