

MATH 5010 - SPRING 2023 (PROF. KINSER) - QUIZ 7

1. (3 points) Let  $F$  be a field,  $K$  an extension of  $F$ , and  $p(x)$  a polynomial over  $F$ .

(i) State what it means for  $p(x)$  to be *separable* over  $F$ .

(ii) State what it means for  $K$  to be *separable* (or *separably algebraic*) over  $F$ .

2. (2 points) For  $n > 1$ , state an equivalent expression for  $x^n - 1 \in \mathbb{Z}[x]$  using either the  $n$ -th root of unity  $\omega = e^{2\pi i/n}$ , or using the cyclotomic polynomials  $\Phi_k(x)$  (you do not need to write any precise cyclotomic polynomial and you are not limited to one).